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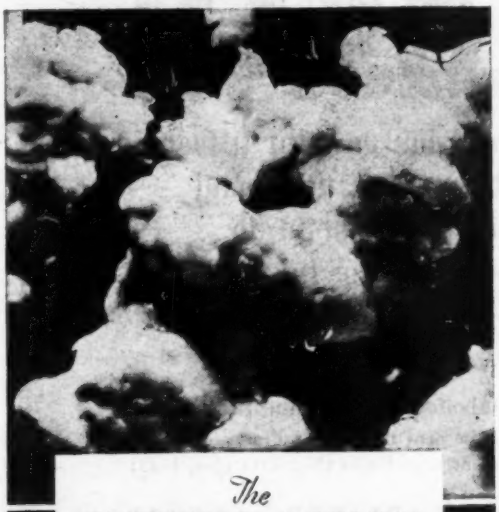

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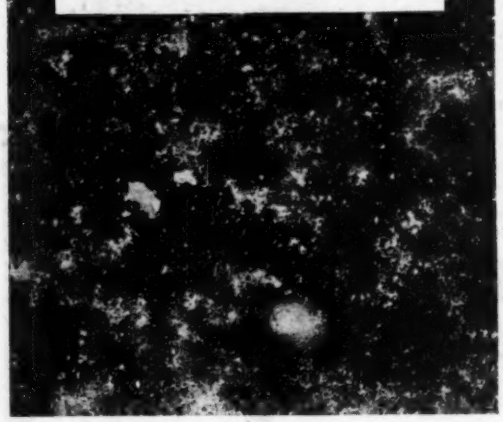

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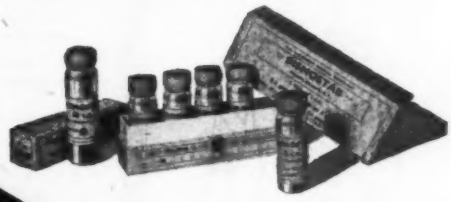

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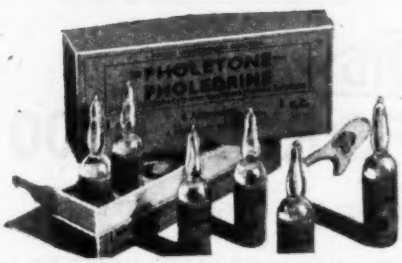

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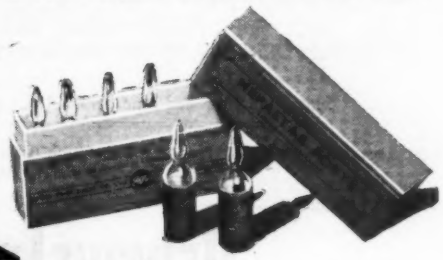

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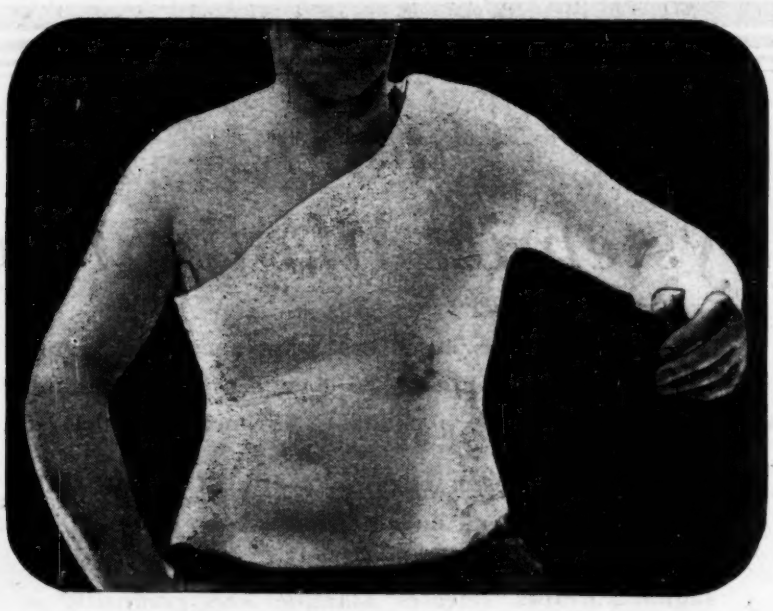

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TREATMENT OF HEAD WOUNDS DUE TO MISSILES

ANALYSIS OF 500 CASES

P. B. ASCROFT, M B E, M S LOND, F R C S
MAJOR RAMC

(From a Mobile Neurosurgical Unit)

THE methods of treating missile wounds of the head here presented have been gradually evolved as the result of nearly two years' experience in the Middle East. In a war of movement segregation of different types of case is impossible in forward areas. At the base, when casualties are heavy, specialised units cannot hope to deal with more than a fraction of the cases. It follows that the military general surgeon must be prepared to deal with wounds of all kinds. The functions of specialised units should be to deal with particularly difficult cases, to study intensively special kinds of injury and to make their results known.

TABLE I—SEVERITY OF INJURY, MORTALITY AND DISPOSAL

—	Mortality in whole series			Disposal of recovered patients *		
	Patients	Deaths	Mortality %	Patients	Invalided on account of head wound†	To duty
Scalp wound only	85	0	0	80	1	76 (95%)
Fracture of skull—						
Dura intact	139	2	1·5	130	10	110 (85%)
Dura pierced	292	44	15	226	93	124 (55%)
Total ..	516	46	9	436	104	310 (71%)

* Data not available in 34 cases.
† 22 patients fit for duty as far as the head wound was concerned were unfit on account of other wounds.

Table I shows the fate of 516 patients wounded in battle by missiles who came under the care of a mobile neurosurgical unit,* attached to a general hospital at the base. Patients arrived at all times from a few hours to more than a week after injury. About three-fifths had undergone operation in forward areas, one-quarter underwent primary operation after reaching the base, and one-eighth were not operated on at all. All patients were kept under observation till fit for duty; or, if unfit, till they were well enough to be evacuated from the Command (seldom less than 60 days after injury). The unit worked for a time in forward areas, thus gaining first-hand experience of battle casualties within a few hours of injury and under the somewhat difficult conditions prevailing in the open desert near the fighting zone.

Head wounds which are not immediately fatal are less lethal and crippling than is popularly believed (table I). The proportion of men who return to duty, even after severe penetrating injuries, is much higher than was anticipated.

PRINCIPLES OF TREATMENT

The great lesson of this war is that treatment of battle casualties depends as much on local conditions as on the nature of the wound. There is nothing new in this. But, under the influence of the siege conditions of the last war, there has been a tendency to forget it. Today, a fixed line of battle is the exception—conditions vary from day to day, even from hour to hour—and the doctor, no less than the fighting man, must be prepared without notice to alter his orthodox plan of campaign.

The general principles of the treatment of all wounds, chief of which is early excision to prevent sepsis, apply to wounds of the head no less than to those of other parts. There are, however, certain pecularities of structure and function of the brain and its coverings which influence the behaviour of head wounds and their treatment.

* Major M. Kremer, neurologist; Major R. W. Cope, anæsthetist; Captain G. B. Northcroft, assistant surgeon; and Major R. S. Hooper, who was assistant surgeon until leaving the unit in February, 1942.

1. The scalp is richly supplied with blood; it has considerable resistance to infection, and heals well.

2. Spreading osteomyelitis of the skull is very rare (no instance in this series of more than 400 compound fractures).

3. The intact dura is a powerful barrier to the spread of infection, and the meninges as a whole have considerable powers of localising infection.

4. The tissue of the brain resists infection well, provided that the products of trauma and inflammation are not allowed to accumulate under pressure.

5. Continued exposure of the brain in an open wound is always harmful, and is always associated with some degree of infection.

It follows that some delay before operation is less harmful than might be supposed from experience with wounds elsewhere, since sepsis is seldom established very soon; and that closure of the wound is highly desirable as a means of protecting the exposed brain, and is often successful in accelerating healing. There are three further points to be considered:

6. Organic damage to the brain is irreparable; and even the gentlest surgical manipulations are damaging in some degree.

7. Surgical manipulations within the skull cannot be carried out effectively without preliminary X rays and special apparatus, especially an efficient mechanical sucker.

8. "Every scalp wound, no matter how trifling, is a potential penetrating wound of the skull" (Cushing in 1918).

FIRST-AID AND RESUSCITATION

First-aid.—Quickly assess the patient's general condition, noting (a) degree of shock; (b) depth of coma; (c) nature of the head wound; (d) other injuries (trunk, limbs). Cut away the hair around the wound, dust the wound liberally with sulphanilamide powder, and apply the first field dressing, securing it firmly with adhesive tape if the patient is confused and liable to tear off the dressing. Bleeding can be controlled by a properly adjusted firm dressing. If the patient can swallow, give 6 grammes of sulphadiazine immediately; if not, give 3 g. intravenously. If the patient is unconscious he should be laid half prone, so that there is no danger of obstruction of the airway by the tongue, secretions or vomit; and he should be evacuated in that position. The Field Medical Card (AF W3118) and the Head Injury Card (AF W3118b) are filled in.

Resuscitation.—Shock is seldom severe in head wounds; when present it is due chiefly to loss of blood, and treatment is by blood-transfusion. Usually 2 to 4 pints are needed. The notion that blood-transfusion in head wounds may provoke dangerous intracranial bleeding by raising the blood-pressure is not borne out by our experience. The first pint is given in 10–15 minutes, the remainder at the average rate of a pint an hour. If operation is performed while the blood is being given, the speed of the transfusion is regulated according to the rate of additional blood loss. In the field, the sedative of choice is morphia. It dulls the alarm and distress inevitably associated with injury in battle and allays violent restlessness which is commoner than in head injuries of civilian life; gr. ¼ is usually effective, injected intravenously. Further doses should be used sparingly.

EVACUATION

In 1917 Cushing recognised clearly that incomplete operations were more dangerous than a few more hours of delay. He was probably thinking in terms of a time-lag of up to 24 hours. In this war most casualties have not reached a base hospital under 48 hours, or more. Nevertheless, recent experience has shown that the results of primary operations at the base, carried out as late as 48 or 72 hours after injury, are at least as good as those of operations done in forward areas within 8 hours, and better than those done 9–16 hours after injury (table II).

We believe it is better not to operate in forward areas, provided that the patient can reach a fully-equipped base hospital within 48–72 hours of injury. That is not to say that there is any merit in delay for its own sake; the sooner a head wound is operated on the better, always provided that facilities are available for a complete operation and proper aftercare.

Over 100 of our cases, many of them severe, were evacuated by air, and they travelled well; there were no

TABLE II—RELATION OF TIME-LAG TO RATE OF HEALING AND MORTALITY

—	(A) Operations in Forward Areas (273 cases)					(B) Primary Operation at Base (94 cases)			
	0–8 hr.	9–16 hr.	17–36 hr.	37–72 hr.	72 hr. plus	17–36 hr.	37–48 hr.	49–72 hr.	4–7 days
Healed in 10 days (%) ..	35	28	14	17	..	75	71	59	68
Unhealed in 30 days (%) ..	35	51	47	51	71	6	24	23	23
Mortality *(dura penetrated only) ..	4 in 27	9 in 37	13 in 63	5 in 23	..	1 in 10	1 in 10	3 in 12	3 in 12

Total mortality for dural penetration = 17% in group A and 16% in group B.
* These figures refer to all patients reaching the base alive; they take no account of deaths in forward areas after operation.

deaths en route. Far more time was lost in getting casualties to the forward landing ground than in the journey thence to the base. The decision to evacuate or to hold should therefore be made at the first possible moment after the patient reaches a forward field ambulance or casualty clearing station. In our view, there are only three valid reasons for retaining head cases in forward areas:

1. Severe shock (evacuate as soon as the patient's condition permits).
2. Urgent surgery essential.
   (*a*) Immediate threat to life by cerebral compression due to intracranial bleeding.
   (*b*) Injuries of parts other than the head requiring immediate treatment.
3. No reasonable hope of reaching a special centre or the base in 48–72 hours.

The conflict between the chronometer and what might be termed "all modern conveniences" is by no means settled. Within certain limits "all modern conveniences" wins, even at the expense of up to 72 hours' delay. But what of the not uncommon case that cannot be evacuated for more than 3 days? Bold is the surgeon who deliberately withholds operation in a forward area, knowing that no surgery can be undertaken for 3 days or more; his whole training is against it. Bold also is he who, lacking the means, attempts a complete operation on a penetrating wound of the brain. As a compromise, it is suggested that when there is no reasonable prospect of a casualty reaching the base in 48–72 hours a modified operation be done on the following lines.

Open toilet of head wounds: an operation of expedience.—Preliminary treatment and preparation are carried out as described below in connexion with the formal operation. The scalp is shaved widely round the wound, which is then thoroughly cleaned. Obviously devitalised scalp is cut away (this does *not* mean formal excision) and all debris and dirt are removed. In the course of secondary operations, we have found that hairs and dirt, forced far beneath the scalp in the subaponeurotic layer, often escape notice. Fractures without a hole in the bone are left untouched. If there is a hole in the bone, it may be enlarged with nibbling forceps, just enough to allow removal of loose fragments of depressed bone or metal visible within the dural tear or in the surface of the brain. No other surgery is attempted. Bleeding is to be avoided, if possible; if disturbance of depressed fragments of bone seems to be about to provoke hæmorrhage, these should be left alone. The whole wound is carefully filled with sulphanilamide powder and left wide open; a protective dressing is applied securely † and the patient is evacuated as soon as possible to the base, where a complete operation should be carried out without delay (vide infra).

The chief objects of this "compromise operation" are to decontaminate as much of the wound as can be done with safety when full facilities are lacking; to provide as free drainage as possible from the deeper parts of the wound; and to allow thorough application of sulphanilamide to as much of the wound as possible. Simply to dump sulphanilamide powder on the untouched wound is not much use. The powder usually lies on top of a mass of blood-clot and debris and does not come into contact with the wound itself.

† A few turns of plaster bandage serve to secure the dressing and protect the head. A diagram of the wound, with the date and time of injury and operation, may be pencilled on the plaster casque.

EXAMINATION AND TREATMENT AT THE BASE

When a convoy of head cases arrived at the base hospital—we have had as many as 100 cases in 3 days—they were dealt with as follows. While he still lay on his stretcher, each man's field cards were read, and his general condition, state of consciousness and any manifest palsies were noted. The wound was not uncovered at this stage, unless the dressing needed readjustment. Next, all patients, conscious or comatosé, were X rayed. Not till that was done were they taken to the wards or operating-theatre.

The object of this brief clinical examination, taking 5 minutes or less, was threefold:

1. To assess the need for resuscitation. The only common emergency measure at this stage was to set up a series of intravenous saline drips. Nearly all patients lacked fluids, and some were dangerously dehydrated.
2. To establish a base-line by which to judge progress for the better or the worse, especially with regard to the level of consciousness.
3. To decide the priority for operation, as judged by the severity and age of the wound, or by evidence from the field cards and personal observation of systemic deterioration.

On the rare occasions when clear evidence of progressive failure of consciousness was available, the patient could unhesitatingly be marked as first for operation. In most cases, however, there was little or no relevant history to be had from the field cards or from the patient; moreover, it was found that immediate clinical examination was but a poor guide to the urgency of operation. It was for this reason that we came to attach so much importance to immediate X-ray examination as the principal means of speedily ascertaining the relative urgency of most wounds.

The urgency of a wound depends largely on whether the dura is penetrated or not; that of a penetrating wound on the degree of damage to the brain and the number of indriven fragments of bone. Study of the X rays for fractures, for the presence and depth of depressed or indriven bone, and for missiles enables one to foretell with considerable accuracy the state of the bone, dura and brain; and therefore (in conjunction with clinical findings) to gauge the urgency of the case. That X rays also provide essential information on the topography of wounds needs no emphasis. In restless patients it may be necessary to give a small intravenous injection of 'Pentothal.' Special views may be required to demonstrate fractures or indriven bone fragments in certain regions where the bone is thin, irregular, or obscured by dense shadows—namely, in the low temporal, mastoid and low occipital regions, the orbit and the vertex.

The nervous system should be examined in detail as soon as opportunity offers, since focal signs, not to be expected from the position of the wound and therefore apt to be overlooked, may indicate the path taken by indriven fragments of bone and metal, the presence of unnoticed wounds, or complications such as intracranial hæmorrhage.

The importance of recording in writing the state of consciousness when the patient is first seen and at brief intervals cannot be overstressed. Changes in the state of consciousness are the most delicate index of the progress of events inside the skull. Onset of drowsiness or deepening of coma is often the only sign of progressive intracranial bleeding, or the accumulation of exudate or pus under pressure. When many cases are to be dealt with and time is short, a nice judgment of priorities often depends on recognition of changes in consciousness. It follows that it is never enough to say of a patient that he is "unconscious" or "conscious." The degree of loss of consciousness should be expressed in terms of loss or depression of important reflexes (corneal, pupillary light reflex, tendon jerks, plantar responses, swallowing reflex, and response to pain or noise), or, in less severe cases, according to the degree of confusion.

Examination of the head and neck is best done in detail when the patient is on the operating-table, anæsthetised, and with his head shaved.

The wound.—Apart from the usual observations to be made in all wounds, certain points may escape notice. Apparently trivial wounds may be of any depth, and the external appearance often gives no indication of the degree of damage to the brain. In wounds of the temporal region the soft, pinkish temporal muscle may closely resemble pulped brain. When the wound is fresh there is no difficulty in distinguishing presenting brain matter from muscle, as the former can be easily wiped away; but after a few days fungating brain becomes firmer and bears a closer resemblance to infected muscle. Recognisable leak of cerebrospinal fluid from the wound is a grave sign; in our experience it has always been associated with opening of the ventricular system.

There may, of course, be more than one wound. Through-and-through wounds comprised 8% of penetrating wounds in this series. The exit wound is usually larger than the entrance and more jagged, the edges tend to be everted, and, when the skull is pierced, spicules of bone blown outwards are often visible. Two or more wounds caused by separate missiles were found often; as many as three penetrating wounds have been seen in a conscious patient, each of them with indriven bone requiring operative removal, along with half a dozen other wounds not involving the brain. Spattering by great numbers of small fragments of metal is quite common. The scalp may show one or more large lacerations surrounded by numerous punctures; or a large area may be "pin-cushioned," no wound being more than a few millimetres in diameter. Occasionally spattering is so intense as to cause extensive necrosis of the scalp.

Wounds of the face, especially of the orbit, often involve the skull and brain and should be regarded as so doing until shown not to; moreover, missiles sometimes enter the skull and emerge by the orbit or face or neck, and unless the scalp is searched carefully the entry wound may not be detected. Sometimes entry or exit wounds of the face are inconspicuous, especially about the eye, where intense bruising and swelling are apt to conceal them.

Damage to the eyeballs is frequent in head wounds, especially in "spatter" injuries. It is important that the cornea be examined in a good light, preferably by an eye specialist. When the patient is stuporous it is very easy to miss a small penetrating wound of the eyeball.

Whenever an air sinus may have been wounded, coöperation of the nose and ear specialist should be sought, especially with regard to detection of the complicating factor of pre-existing sinusitis or otitis. Loss of cerebrospinal fluid from the nose has the same grave significance as in blunt injuries, for it indicates that there is an open road for bacteria or air to the meninges and brain. Cerebrospinal rhinorrhœa is seen most often in wounds about the frontal sinuses. It is seldom recognisable for at least 24 hours after injury, as bleeding obscures it. Bleeding from the nose is usually due to wounds of the forehead and upper part of the face; or occasionally of the base of the skull, but this is rarely seen, since such wounds are as a rule quickly fatal. Sometimes however bleeding from the nose is not related to the wound and is then usually of little significance, being often due to the man having been knocked down by blast and having struck his nose on the ground or on the brim of his steel helmet.

Bleeding from the ears is usually due to the effect of blast on the drum. Rupture of the drum was found in up to 20% of our cases. Routine examination of the ears often reveals unexpected tears. In two cases a small missile entered the external auditory meatus and pierced the wall of the auditory canal; externally the wounds were invisible.

Injuries of other parts of the body may be overlooked, especially when the patient is unconscious. The whole body should be examined. When the head wound is severe minor wounds elsewhere may not be treated with the respect they deserve, occasionally with disastrous results. In two instances of penetrating wounds of the head which had healed without incident, brain abscess developed, probably as a result of metastatic infection from septic limb wounds, and one patient died. The other side of the picture is commoner; just as a serious head wound may divert attention from wounds of other parts, so a mangled limb may lead to an inconspicuous yet more dangerous head wound being overlooked.

Lumbar puncture.—The value of lumbar puncture before primary operation is limited. There is one exception: if cerebral compression due to intracranial hæmorrhage is suspected—a condition demanding urgent operative relief—the best means of confirming the diagnosis and estimating the urgency of operation is to measure the pressure of the lumbar spinal fluid. A pressure of more than 250 mm. usually means that immediate operation is necessary. Changes in the fluid distinguishable as due to infection and not to trauma alone (blood is always present in penetrating wounds) are seldom seen for 48 hours or more. Exceptionally, however, fulminating meningitis has been observed in wounds involving an air sinus and at the same time the ventricles or basal cisterns. After operation, on the other hand, lumbar puncture is of the highest diagnostic, therapeutic and prognostic value.

PREPARATION FOR OPERATION

Anæsthesia.—Local anæsthesia can be used less often than might be expected; many patients are too restless, while others have wounds elsewhere unsuitable for local anæsthesia. An excellent alternative, both in forward areas and at the base, is sodium pentothal. Anæsthesia is induced with about 0·5 g. as a 5% or 10% solution given with a syringe, and is maintained by the intravenous drip method using a 1% solution. Induction is swift and not unpleasant; post-anæsthetic retching and vomiting are rare. Breathing is quiet during operation, the brain does not bulge, the venous sinuses are not engorged, and conditions are as good as they can be for intracranial manipulations. The same quietness and lack of vascular engorgement is not always secured in a struggling patient under local anæsthesia.

In skilled hands pentothal is a safe anæsthetic for head cases. If used carelessly it is dangerous; reckless induction, an obstructed airway, in particular the slightest delay in dealing with impeded breathing, spell disaster. Major Cope, specialist in anæsthesia to the unit, was very careful not to overdose stuporous patients or those whose respiration was depressed. He gave the initial injection very slowly, all the time watching the effect on the breathing, in order to assess the patient's tolerance to the drug. As soon as the patient was unconscious, an airway was inserted and the oxygen tube attached in readiness. At this stage breathing sometimes became imperceptible. The patient was not allowed to become blue; oxygen was turned on immediately and the chest rhythmically compressed till proper breathing was re-established, usually in a minute or two. In no case was the face covered with drapes until breathing was seen to be easy. Once the patient had settled down after induction further respiratory embarrassment was unusual. When the face is concealed and the operation is in progress the surgeon must make himself responsible for warning the anæsthetist whenever the colour of the blood is not perfect.

Position on the operating-table.—Wounds of any part of the head can be dealt with satisfactorily on the standard Army type folding operating-table, with the addition of a few small loosely packed sandbags. When the longitudinal or the lateral sinus may be damaged the head of the table should be raised, or the patient propped up with pillows, so as to reduce the pressure of blood in the venous sinuses.

Preparing the field of operation.—It is a painful and lengthy operation to shave the scalp of a conscious patient about inflamed, lacerated and often multiple wounds, when the hair is cemented in a matrix of blood and sand; and it soon became our custom to prepare the scalp under pentothal anæsthesia. A good lather with soap and a close shave leave the scalp clean. No further preparation was used except to wipe the skin with a mild antiseptic. During the battle of El Alamein one surgical team did 100 operations, two-thirds of them on brain wounds, in 12 days. This experience convinced us that time is saved by not skimping the preliminaries. Careless placing of the patient on the table, niggardly shaving, and indifferent arrangement of the drapes all make for slipshod or slow and wearisome operating. The custom of using moist towels (wrung out of warm 1/1000 perchloride of mercury) to drape the head is worth adopting; they adapt themselves to the contour of the skull more readily than dry ones and are less apt to slip. An over-

table of the Mayo type, arranged so as to keep the drapes off the face, allows the anæsthetist easy access to the nose and mouth.

Transfusion.—The hæmoglobin value in most large wounds of the head two or three days after injury is seldom more than 80% and often much lower. Further loss of blood at operation may cause a rapid fall of blood-pressure not easily restored to normal. It was the custom in such cases to start transfusion before operation, whether there were signs of shock or not.

THE OPERATION

Scalp.—Before the incision is made the X rays should again be inspected. When a fracture is seen its position should be carefully compared with that of the scalp wound. Should the missile have entered obliquely, especially where there is some depth of soft tissue over the bone, as in the temporal region, the fracture may lie at a distance from the breach in the scalp. A probe passed gently through the wound will usually determine the site of the fracture exactly, and the incision is planned accordingly.

The wound is excised as narrowly as possible and the incision extended so as to give comfortable access to any underlying lesion (fig. 1). Thus the shape of the incision will depend on the shape of the wound, the exposure required, and to some extent on the method of closure to be adopted. Wounds due to missiles are far more destructive than scalp wounds of civilian life, and more radical excision is necessary. There may be but a small external wound, but when it is opened up extensive loss of tissue of the deeper layers of the scalp may be found (fig. 2). The dermis is usually least damaged; beneath it the fibro-fatty layer is missing over a larger area, and disorganisation may extend well beyond the torn surface, as shown by infiltration with dark blood, failure to bleed when cut, and large droplets of free fat. The galea is destroyed to a similar and perhaps greater extent. It may be necessary in these wounds to sacrifice much apparently intact skin so that the edges of the final wound will be vertical and not bevelled inwards.

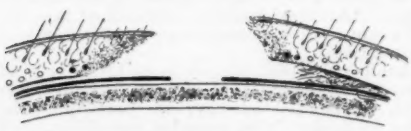

Fig. 2—Section of scalp wound to show undermining of subcutaneous layers. The aponeurotic layer, with the vascular plexus overlying it, often suffers most. The pericranium is usually affected less. Hair and other debris are often driven far in beneath the galea and pericranium.

Burning of the edges of the wound by high velocity missiles is not unusual, especially if a piece of metal of some size is arrested in the wound or beneath the scalp. The coagulated tissue should be excised. When the missile lodges in the scalp some distance away from the point of entry, the overlying patch of scalp may be cooked (fig. 3). The burned area, which should be excised, is easily recognised, providing the possibility is kept in mind; it looks dead and does not bleed if nicked with a tenotome. The bone beneath, though to the naked eye unchanged, may also be killed by the heat; such a case should be kept under observation lest sequestration occur.

When the scalp wound has been excised, careful search is made in the wound for hair, dirt, and sand, which are sometimes driven far into the subaponeurotic space. When there is more than one wound it is usually best to excise each separately, unless they are close together, when they may be excised in one piece. Through-and-through wounds caused by tangential missiles are best excised separately and the incisions joined so as to expose the whole track (fig. 1). Damaged temporal or nuchal muscle should be excised with the same thoroughness as muscle in other parts of the body. Destruction of the muscular layer is often much more extensive than in the scalp above and bone beneath. Small missiles causing no more than wee punctures in the scalp and temporal fascia have been found to destroy the muscle widely.

Violence that causes a depressed fracture almost always tears the pericranium. Hence it may be said that when the pericranium is intact, and in the absence of other indications, it should not be incised nor the skull opened.

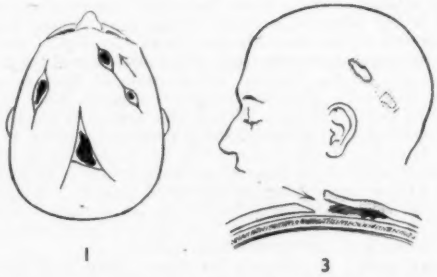

Fig. 1—Incisions commonly used. In tangential through-and-through wounds (upper right in diagram) the whole track should be exposed.
Fig. 3—Burn caused by a missile lodging beneath the scalp. The edges of the wound and the scalp are "cooked."

In spatter wounds confined to the scalp excision is unnecessary, except in the rare instance of traumatic necrosis. An attempt may be made to pick out the larger pieces of metal seen in X rays with small artery forceps inserted into the punctures, but the holes should not be enlarged. The wounds are then powdered with sulphanilamide and dressed. Sometimes a small abscess requiring incision develops in connexion with one or more fragments; the foreign body usually escapes when the pus is released.

The bone.—The appearance of the fracture depends on the size, momentum and direction of the missile; on the part of the skull struck; and on the characters of the individual skull, in particular the texture and thickness of the bone and the relative thickness of the inner and outer tables and the diploë. Since all these factors are variable, all shapes and sizes of fracture may be encountered, and all degrees of comminution. Except for linear fracture, treatment is substantially the same in all—excision of the fracture with the object of discouraging infection by removing all detached fragments of bone, and of laying bare any underlying lesion of the dura and brain for surgical attack. Experience suggests that excision should be conservative; bone should be removed as far as the extent of the damage to the inner table, not further. We have never employed the method of excision en bloc.

There is a tendency to remove far too much bone, partly to obtain wide exposure, and partly with the mistaken idea that wide local decompression is necessary. Many patients end up with large holes in the skull, 5 or 6 cm. in diameter. Most bone defects caused by missiles are small, and when the fracture is excised the defect need not as a rule exceed 3 cm. in diameter. A gap less than 3 cm. usually fills with firm fibrous tissue and is little or no disability.

TREATMENT OF SPECIAL FRACTURES

The commoner kinds of fracture, with what is believed to be appropriate treatment, are described below.

Linear fracture.—Occasionally a narrow crack is seen in the X ray or at operation to underlie a scalp wound due to a missile. The mechanism of the fracture is obscure. Sometimes the pericranium is intact. Nothing should be done to the bone unless there is evidence of cerebral compression by clot, when a burr hole should be made to verify the diagnosis. It is common

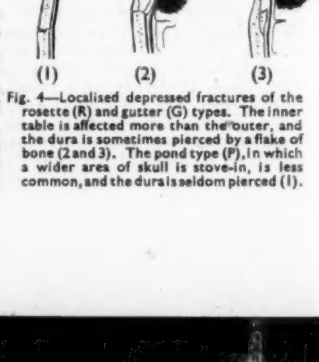

Fig. 4—Localised depressed fractures of the rosette (R) and gutter (G) types. The inner table is affected more than the outer, and the dura is sometimes pierced by a flake of bone (2 and 3). The pond type (P), in which a wider area of skull is stove-in, is less common, and the dura is seldom pierced (1).

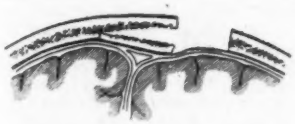

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Fig. 5—Section through site of a depressed fracture that has been excised. One or two large flakes of inner table may be partly detached and depressed. To remove them requires sacrifice of much intact bone, and if the fracture overlies the longitudinal or lateral sinus serious bleeding may occur. If the wound is reasonably clean it may be best not to remove such fragments, but simply to lever them into position.

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Fig. 6—Depressed fracture affecting the inner table alone. Occasionally the dura is pierced.

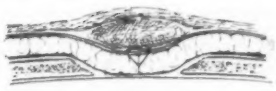

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Fig. 11—Bevelling the outer table and application of pressure pad to reduce dead-space.

to find fissures radiating from depressed fractures, but they do not call for any modification in surgical treatment of the depression; not even when the fissures are wide and associated, as occasionally they are, with lacerations of the dura extending from the wound itself.

Depressed fracture without loss of substance (no hole).—(*a*) *Rosette and gutter types* (figs. 4 and 5). Such fractures should always be explored. A burr hole is made at the edge of the fracture. The burr is to be applied gingerly, for two reasons: the underlying inner table may be missing, so that the bone may be much thinner than anticipated; and occasionally portions of skull at the edge of the depression may be loose, being enclosed by linear extensions from the fracture. All broken and depressed flakes of bone are removed, and the edge of the

7a 7b 8

Fig. 7a—Tangential missile. A long furrow is cut in the bone, which is extensively fragmented. There is considerable laceration of the brain.

Fig. 7b—Tangential missile. Plates of bone are elevated and small fragments are deeply indriven. There is very severe damage to the brain.

Fig. 8—Typical through-and-through wound. Entry and exit fractures are small. Injury to the brain is less extensive than in fig. 7, but because it is deeper the injury may be even more dangerous.

defect is trimmed with rongeurs as far as the limit of fracture of the inner table.

(*b*) *Pond, or stove-in fracture* (fig. 4). Sometimes, instead of the rosette, less abrupt depression of a wider area is seen, especially if the skull has been struck by a large, slow-moving missile. Unlike the localised rosette type of depressed fracture, the stove-in type should be elevated but not excised. A burr hole is made at the edge of the fracture, as near as possible to the site of maximum damage and depression, loose fragments of bone are removed and any small depressed flakes. The larger depressed plates are levered up into position, and, if they appear to be viable and there is no gross sepsis, are left in situ.

(*c*) *Fracture of the inner table alone* (fig. 6). Fragments of inner table may be depressed or even driven into the brain without any depression, and sometimes without detectable damage to the outer table. As a rule, X rays show the depressed bone plainly. At operation the skull at first seems to be normal; but when closely examined at the place where the pericranium is torn (and it almost invariably is torn) one or two faint, irregular hair-line cracks are found, indicating the site of damage. Occasionally there is no trace of fracture, but faint bruising or metallic staining may give a clue, as in the following case.

CASE 1.—A lacerated wound in the left upper parieto-occipital region had been excised in a forward area. It was stated in the notes that there was no sign of fracture. X rays taken at the base showed a conspicuous group of depressed fragments beneath the wound. One large flake was depressed 2 cm. The wound was reopened and the pericranium was found to be torn, but a long search showed no trace of fracture. So prominent was the fracture in the X rays that the mystified surgeon insisted on the identity of the X rays and of the patient on whom he was operating being proved there and then. All was found to be in order. The bone was again inspected and a faint bluish mark was noticed which might have marked the site of impact of the missile. A burr hole was made and three large detached flakes of inner table were found; one had pierced the dura. Reinspection of the X rays in the stereoscope showed that there was no way of telling that the outer table was not broken.

Though scoring or pitting of the outer table may occasionally occur without fracture a burr hole should always be made adjacent to the mark if there is any reasonable doubt. Sometimes there is to be seen in operation notes the observation, "Fracture of the outer table only, therefore not trephined." For all practical purposes fracture of the outer table alone does not occur; the inner table is also damaged and always more so.

It is worthy of note that the impact of a missile sufficient to groove or dent the bone may determine local sequestration, should the wound become septic.

Penetration of bone.—A localised depressed fracture of the skull without actual holing is not as a rule associated with penetration of the dura; but the presence of a hole in the bone, be it ever so small, nearly always means that the dura is pierced also. When the skull has been struck squarely the visible hole is usually little larger than the missile; indeed, the shadow of a missile seen radiologically to be lying in the brain may make one wonder how so large an object could have passed through so small a hole. When the impact is oblique the fracture is usually more extensive and irregular. As in depressed fractures, bone is nibbled away as far as the extent of the fracture of the inner table, beyond which the dural wound seldom extends.

Furrow fracture.—Tangential missiles when of some size may cause considerable destruction by cutting a long furrow in the skull (fig. 7*a*). Some fragments are depressed; others, perhaps, elevated, according to the depth the missile attains as it traverses the head. Externally small entrance and exit wounds in the scalp may give little indication of the extent of damage to the bone. The missile (e.g., rifle bullet) may traverse the surface part of the brain, make separate holes in the dura, and yet plough up the bone from end to end of the track. Good exposure in this kind of wound is obtained by joining the entry and exit wounds in the scalp when they have been excised.

Elevated fracture.—Two kinds are met with, the bursting and the slicing. The bursting kind is shown in fig. 7*b*. Should a missile of some size pass tangentially through

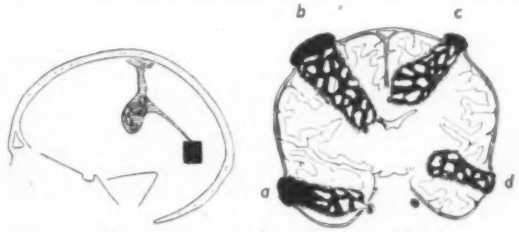

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Fig. 9—Thorotrast outlines the brain track and the flask-shaped abscess cavity, which contains indriven bone fragments. A very narrow track marks the path taken by the missile, which lies in the occipital lobe.

Fig. 10—Sources of deep bleeding in penetrating wounds. (a) Wound of temporal lobe involving the cortex on the inner surface; a spicule of bone impinges on the internal carotid artery. (b) Deep wound entering the lateral ventricle; the choroid plexus is in danger. (c) A common type of wound damaging branches of the anterior cerebral artery in the great longitudinal fissure. (d) Penetration of the temporal lobe; fragments of bone may have damaged the middle cerebral artery in the sylvian fissure.

the head not far from the surface (but deep enough not to furrow the bone) one or more large plates of bone are apt to be raised up between the points of entry and exit. Shattered fragments of bone about the track of the missile are removed, but large displaced plates often retain good vascular connexions and may be pushed back into position.

The slicing type of wound may be caused by a large flat piece of metal, the edge of which strikes the head a glancing blow and raises a kind of osteoplastic flap. Since these wounds are incised rather than lacerated they are less formidable than their appearance and size suggest. The elevated bone should not be removed; the whole flap should be accurately replaced without detaching it from the pericranium.

Foreign bodies in bone.—When metal is embedded in bone there is almost always an associated fracture involving the whole thickness of the skull, and removal of the metal is simply a step in excision of the fracture. Sometimes when metal is impacted in the outer table, the walls of the pit in which it lies may seem to be intact; nevertheless, the inner table is broken and depressed. In our experience it is always unwise to leave metallic fragments embedded in bone, even when the wound has healed before they are discovered, because of the frequent recrudescence of infection and osteomyelitis. The only exception is when operation is obviously difficult and dangerous, as in the rare instance of a missile lying in the base of the skull.

THE DURA

Dura intact.—An intact dura almost invariably prevents spread of infection to the brain. There is only one reason for opening it in a contaminated wound—immediate threat to life from subdural clot. Discoloration of the dura is not a reliable sign of the presence of clot; the clinical rather than the local condition should be the main guide. A nick of 2 or 3 mm. is enough to verify the diagnosis.

Dura obviously torn.—Nothing need be done to the dura except to cut away with scissors any tags. The opening should not be enlarged unless it is essential to gain a little more room—for example, in order to ease out a large superficial foreign body from the brain, or to control bleeding.

Inconspicuous dural tear.—We have had cases in which notes from forward areas described the dura as intact and subsequent X rays have shown metal in the brain. A depressed flake of bone may cause a linear slit which will escape all but the closest scrutiny. These slits do not call for immediate treatment; like all dural tears, their importance lies in the fact that they are a breach in the main line of defence of the brain against infection. Early recognition of complications may depend on a knowledge of the state of the dura at primary operation, yet this is an item of information often omitted from the field card.

Sometimes the dura is separated from the bone around the fracture, and foreign bodies may lie concealed beneath the bone; in one case operated on in the forward area a thick lock of hair had escaped notice, and in another a piece of metal weighing 50 grammes.

THE BRAIN

In the typical penetrating wound a small area of skull, usually 1–3 cm. in diameter, is shattered and a shower of bone fragments is driven through the dura into the brain to a depth of a few centimetres. In about half the cases the missile also passes into the brain, usually well beyond the deepest bone fragments; often, however, the missile bounces off the skull. It is usually impossible to be certain by appearances at operation whether or not the missile is retained.

There is a striking relation between retention of bone fragments and development of brain abscess. The object of the operation on the brain is to remove as many indriven bone fragments as possible, to remove hopelessly damaged brain, blood, exudate, and foreign matter, such as hairs, fragments of scalp and bits of hat. Metallic foreign bodies are only removed if they lie alongside the bone debris; if, as is usually the case, the missile lies deeper it is best left well alone.

When the fracture has been excised and the dural defect exposed a conglomerate of pulped brain, blood-clot and bone fragments is usually seen to occupy the hole in the dura, often forming a firm plug. Soft material is sucked away from the surface and any visible bone fragments are lifted out with forceps. As soon as the plug is loosened pent-up debris often begins to extrude spontaneously, sometimes like tooth-paste, sometimes in the form of a sudden gush of bloody fluid or clot, carrying with it numerous small flakes of bone. If the patient is conscious, he may assist in the evacuation of debris by straining. With the help of the sucker (10 lb. pressure) the track of the wound is cleared and its limits defined. Remaining bone fragments are picked out gently with fine forceps. While it is of the utmost importance to take out as many bone fragments as possible (their position and number being checked by reference to the X rays) more harm than good is done by too assiduously ferreting for small outlying spicules.

If the track is narrow it may be difficult to define and follow, especially when the wound is no longer fresh, and in the search for fragments of bone false passages may be made in the brain. When the track is indistinct the relative position of the bone defect and of indriven bone as seen in the X rays is the best guide. The position of deep-lying metal may be misleading, for should the missile pass through the brain and strike the opposite side of the skull it may be deflected back into the brain at a tangent for some distance. On two occasions, also, we have quite failed to appreciate the course of the brain track when the missile entered the body of the lateral ventricle and rolled back into the occipital horn.

When a thin part of the skull is pierced, such as the squamous temporal bone, or even when a very small missile passes through a thicker part of the skull, practically no bone is driven into the brain. There is but a minute hole in the dura, cerebral damage is strictly localised to the track of the missile, and, providing bleeding has been slight, almost no debris exudes. In these cases the dural wound should not be enlarged nor the track explored.

Deep tracks and through-and-through wounds (fig. 8).—When a missile of some size has passed deep into the brain, or through it, it may not be possible to clear the depths of the track because of the risk of starting deep and uncontrollable hæmorrhage, and the danger is greatest when the ventricle is involved. In a wound traversing the brain, the exit and entry are dealt with separately, the track being cleared from each end as far as safety will allow. The wound of entry calls for most attention, since bone fragments are driven in; it is a curious fact, however, that at the exit wound also bone fragments may be found buried in the brain.

A cavity in the brain, sometimes of surprising size, may persist when the wound track has been cleared, and sometimes communicates with the lateral ventricle. When the plug in the dural defect is loosened there may be a prodigious gush of blood-stained watery fluid in which float shreds of disintegrated brain; or the cavity may be full of tough blood-clot or dark liquid blood. When the cavity is emptied all bone fragments are usually found to have been removed.

Extensive superficial wounds are usually caused by large missiles striking the head obliquely, or by those of high velocity, such as a rifle bullet, causing tangential through-and-through wounds. Though formidable in appearance and very destructive, such wounds are less often fatal, or even crippling, than might be supposed. Considerable fungation of pulped brain is the rule. When this is sucked away fragments of indriven bone are readily removed, as they are usually large and not far from the surface.

Metal in the brain.—Infection seldom arises round metal deeply embedded in the brain. Fragments of metal usually pass much deeper than infective debris and bone fragments, and thus are able to shed most of the contaminating material (of less momentum) which they drive in. The little that still clings is probably often sterilised by the heat of the metal, and immediately behind it the track in the soft brain tends to seal off. Whether this explanation is the true one or not, experience has shown that deep, isolated metallic foreign bodies seldom cause trouble and are best left alone. One of our earliest cases illustrates strikingly the relative significance of metal and indriven bone as regards sepsis.

CASE 2.—This man was struck in the left parietal region near the vertex by a large missile which came to rest in the left occipital lobe. Operation of the "open toilet" type was done in the forward area. A small brain fungus developed. Ten days after injury pus discharged from the fungus, which shrank away, leaving an open track into the brain. A little thorotrast was run into the track and the head was X rayed (fig. 9). A flask-shaped abscess cavity containing several fragments of bone was outlined, and from the cavity a very narrow track led to the distant missile. As the patient was much improved since the abscess had drained spontaneously, it was thought best not to operate again. During the next 4 months the wound never healed, and he twice nearly died when the abscess flared up. By that time we had learned the true significance of indriven bone fragments. They were therefore removed (5 months after injury). The wound healed quickly. Six weeks later, when the cerebrospinal fluid had been normal for a month and air encephalography had shown no sign of a space-occupying lesion, he was invalided out of the command, the missile still in his occipital lobe. Had it lain alongside the bone fragments it would, of course, have been removed.

Bleeding from the brain wound.—Good hæmostasis is vitally important in brain wounds. Without full equipment this is difficult to secure. We relied almost entirely on electrocoagulation, and, for large vessels, on Cushing's silver clips.

As soon as bone fragments lying in the dural defect are disturbed torn cortical vessels usually begin to bleed again. They sometimes retract beneath the torn edge of the dura and may be difficult to secure unless the dural opening is enlarged a little. Once the superficial vessels have been sealed the rest of the track can often be evacuated without further bleeding, as white matter is relatively avascular. But if the wound involves an important fissure or the under- or inner surface of the hemisphere (fig. 10), deep and uncontrollable bleeding may be provoked by dislodging a fragment of bone or by injudicious suction. Deep bleeding was encountered most often in wounds near the vertex, in which bone fragments had pierced the brain and had lodged against the falx.

CLOSURE OF THE WOUND

When proper hæmostasis had been secured, the whole wound, including the brain, was liberally dusted with sulphathiazole powder (not crushed tablets). When the brain track was narrow a thick cream of powder and saline was injected under low pressure through a soft rubber catheter inserted down the track. No untoward reactions, of the kind described by Watt and Alexander,[1] were observed. It should be added, however, that if the ventricle was opened only a very small amount of sulphathiazole was left in the brain wound.

Drainage.—In our view all wounds of the head due to missiles should be drained. A small piece of soft corrugated rubber (½ to 1 corrugation) is brought through a stab wound in the scalp, and so placed as to afford gravity drainage when the patient is in bed. In penetrating wounds the drain should reach to the edge of the dural defect; or when the wound is dirty well down into the brain track. In clean (i.e., surgical) wounds the possibility of leak of cerebrospinal fluid may make drainage inadvisable. Loss of fluid from missile wounds of the calvarium, in our experience, always comes from the ventricle, never from the subarachnoid space. Ventricular wounds are notoriously dangerous on account of grave risk of ventriculitis. If there is the slightest rise of pressure in or about a wound communicating with the ventricle, infected or potentially infected exudate will pass into the ventricle. It is safer to direct the flow to the exterior. It seems wise not to remove drains too soon; say, not before the fourth day, and if there is infection not for a week.

The dura.—It has been our practice from the first never to close the dura in penetrating wounds due to missiles, and experience has not led us to alter it. In a series of 25 cases cultures taken from the track in the brain at operation 30 hours to 7 days after injury were sterile in 4 only. Twelve per cent. of our patients who underwent primary operation at the base developed brain abscess. In a small number of patients operated on in forward areas a few hours after injury the surgeon had closed or had attempted to close the dura; the incidence of sepsis in this group was disproportionately high.

When a wound is more than 24 hours old—and very few are operated on at the base earlier—the possibility of decontaminating the brain wound well enough to make closure of the dura safe seems remote. To close the dura encourages rise in tension in the contaminated track; infection is apt to become established and to spread through the soft brain towards the ventricle. When operative decontamination of the brain track is thought to be incomplete, the patient's safety depends on the establishment and maintenance of free outlet for exudate from the brain wound into the subaponeurotic space; and drainage of this space to the exterior is hardly less important.

The bone.—Plastic repair operations have no place in the acute stage.

When the scalp is united over a small defect in a thick skull a dead-space is left which may determine the onset of infection. The space can be reduced by bevelling the outer table (fig. 11). The scalp then sinks more easily into the defect, and is encouraged to do so by incorporating a small pressure pad in the centre of the dressing.

Muscle.—Buried sutures are best avoided in the temporal or nuchal muscles. They have often been found to cause stitch abscesses, just as in wounds in other parts of the body. Dead-space left by excising damaged muscle is obliterated as far as possible by pressure dressings, and accumulation of blood and exudate prevented by drainage.

The scalp.—In the absence of gross sepsis the scalp wound should usually be closed. Experience and the weight of authority emphasise the importance of careful suture, especially in craniocerebral wounds, and attest how approximation of the galea aponeurotica is the key to a sound wound. Much, too, has been written on how to close the wound when there is loss of tissue, and many ingenious and artistic incisions and flaps have been designed to this end. Most people, however, find that closure of wide scalp wounds is an awkward and exasperating business. A great deal of time and sweat and blood may be lost in extending incisions and making new ones, in the hope of wheedling from a thick and obstinate scalp that elusive little bit of slack. Too often the labour is in vain; either approximation is not achieved at all or closure is so insecure that the (enlarged) wound breaks down after a few days.

One thing is certain. It is worse than useless to drag together the skin edges forcibly with heavy mattress sutures; ischæmic necrosis is the result (as we have seen many times), and the wound breaks down. Though in a clean wound every effort should be made to close the scalp, especially when brain is exposed, the same cannot be said for wounds already infected. Infection of moderate degree may not interfere with healing when closure has been easy and is without tension, but when there is tension the same degree of infection will often cause the wound to break down. Suture, if unwise and ill-performed, provokes the very state it is designed to prevent. There is no doubt that some wounds are better left open.

POSTOPERATIVE TREATMENT

Nursing the stuporous patient.—Patients who are fully conscious and able to look after themselves require no special nursing care. Those who are stuporous, uncooperative, restless or violent demand the utmost efforts of the nursing staff if they are to receive proper treatment; in fact, without skilled and devoted nursing, many of these patients will die. It is estimated that to manage a ward of 50 head cases, the majority of which are serious, 6 trained sisters and 12 medical orderlies are required, in addition to 8 well and willing patients to act as trolleymen and kitchen helpers.

Comatose patients, who lie like logs, soon develop pressure sores if not turned every few hours. Incontinence often accompanies coma or stupor and adds to the danger. The skin should be dried and powdered and the sheets changed whenever the bed is wet. Patients suffering from severe head wounds often scratch so violently that extensive excoriation of the skin is common; they often move their legs up and down continuously for hours at a time, wearing away the skin over the heels, ankles and knees. Finger-nails should

1. Watt, A. C. and Alexander, G. L. *Lancet*, 1942, i, 493

therefore be cut short, and it is sometimes necessary to splint the limbs.

Fluid and food.—Most battle casualties, especially in hot weather, are more or less dehydrated, and the head injury is no exception. If the patient can swallow without choking (as tested by causing him to suck a swab wetted with sterile water) he should be given all he wants to drink. The severely wounded man, however, usually has neither the sense nor the energy to help himself, and it is not enough simply to leave a jug of water on his locker. He must be persuaded to drink. It is a good plan in a busy ward to tell off a reliable orderly to do nothing else but go round "forcing fluids."

When swallowing is impaired it is as well to set up an intravenous drip without delay ‡; if a patient is unconscious on arrival at the base he is certainly in urgent need of fluid. In all cases in which dehydration is to be feared a fluid-balance chart should be kept up to date. When swallowing is impaired for more than a day or two the patient begins to suffer from lack of food. This should be made good by giving a balanced ration through a nasal tube.

Sedation.—Those who have nursed a large number of head wounds find that something stronger than the familiar mild sedatives is sometimes essential; not for the relief of pain—severe or intractable pain is rare—but to control patients who are difficult to manage. It is imperative to curtail that persistent restlessness, occasionally amounting to mania, which makes the patient a menace to himself and others; to himself because he tears off his dressing, pulls out his intravenous drip needle, falls out of bed, and exhausts himself by his struggles; to others because he requires constant attendance, so straining further an already over-strained nursing staff. Intravenous paraldehyde has proved an acceptable alternative to morphia; 3 c.cm. of the pure drug as supplied by the dispensary is injected intravenously very slowly. This causes the patient to cough violently, but he quickly falls asleep. Quiet sleep can be maintained by adding to the intravenous drip fluid enough paraldehyde to maintain a flow equivalent to 1 c.cm. of the pure drug in 1 to 3 hours, according to requirements.

Return to activity.—If all goes well return to health is rapid after a head wound. Headache is shortlived and the patient soon wants to be up. The period of clouding of consciousness or stupor often seen in severe injuries may persist for several days; then it disappears rather suddenly as a rule, and within a day or two the patient is found sitting up in bed, chatting to his mates, reading the paper, and taking part in the normal life of the ward.

In accordance with the policy of minimising to the patient the significance of injuries of the brain, it has been the practice in this unit to allow patients to resume their normal activities as soon as they feel well enough. Men are allowed out of bed, if they feel up to it, within a few days of injury, provided they are free from fever. They are encouraged to help in the ward, to go to concerts or out on pass into the town. Good rather than harm comes of this policy, providing reasonable precautions are taken to curb the enthusiasm of the euphoric and protect the partly disabled. (Hemianopics and aphasics should not leave the hospital unaccompanied; though an aphasic accompanied by a hemianopic makes a safe combination!) Lack of desire to follow the normal pursuits of the convalescent patient usually means the presence of some complication such as brain abscess. If no sign of intracranial mischief is discovered, the patient should be actively encouraged to get up and about.

In a busy ward there are plenty of useful jobs for convalescent patients to do, jobs that provide physical exercise and opportunity to show initiative, and, as the men themselves can see at once, that are well worth doing. A good sister will soon have convalescent patients helping in the kitchen, ferrying meals and cleaning the ward. She will make one man responsible for collecting linen, appoint another to collect stores, a third and fourth to help lift patients, four more as trolleymen to take patients to and from the theatre and X-ray department. This is useful and responsible work, in fact ideal occupational therapy, more satisfying in this respect than to wield a bodkin or a fret-saw. Moreover, activity among convalescent head-injury patients encourages the new patients, who may be alarmed and despondent at the thought that their brain has been injured.

‡ It is a good plan to set up an intravenous drip in all severe and difficult cases at the first opportunity; chemotherapeutic agents, sedatives, &c., may then be conveniently given along with fluids.

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TOXICITY OF TANNIC ACID

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THIS paper describes experiments carried out at the request of the Burns Sub-Committee, War Wounds Committee, Medical Research Council, on the problem of the possible toxic effects resulting from the absorption of tannic acid from a burned surface. The studies were suggested by Lieut.-Colonel W. C. Wilson, RAMC, in unpublished reports to the War Office and the Medical Research Council from an Army medical research section in the Middle East. In experiments made before he left Britain, Wilson had found that tannic acid was toxic to animals; and in a memorandum submitted to the burns subcommittee in May, 1942, he referred to the possibility that absorption of tannic acid might be a cause of toxæmia in human cases of burns so treated. His experience in the Middle East, though admittedly inconclusive, had indicated that toxæmia was more common and severe in burned patients treated with tannic acid, and he described definite pathological changes in the livers of patients who had died in the toxæmic stage after tannic acid treatment. His earlier experiments in animals had shown that injury to the liver was the most obvious abnormal feature of mice killed by injections of tannic acid or sodium tannate.

Wells and his colleagues (1942) reported a series of post-mortem findings in patients dying during the first few days after severe burns. All had been treated with liberal amounts of tannic acid and all showed a characteristic picture of liver necrosis. These workers also produced a similar lesion in the livers of rats by subcutaneous injections of tannic acid. They go so far as to suggest that specific changes in the liver have been reported in fatal cases of burns only since the introduction of tannic acid by Davidson (1925). Pathological changes in the liver after burns had, however, been described earlier, in both man and animals (Bardeen 1897, Pfeiffer 1905, and Olbrycht 1924), but it is true that a more specific liver lesion—a hæmorrhagic central necrosis with a polymorph infiltration—has been reported in human cases only since 1925 (Wilson 1942). Descriptions of these lesions are found in the reports of Wilson and his colleagues (1938), McClure (1939), Belt (1939), Brins and Hartmann (1941) and Wells and his colleagues (1942). It is noteworthy that all the cases referred to in these reports, including the animals of Brins and Hartmann, had been treated with some type of tannic acid preparation and that Allen and Koch (1942), who do not use tannic acid, have not, in a considerable series of autopsies, seen the extensive liver changes described by Wilson and his associates. Such evidence is clearly suggestive, and in view of the widespread use of tannic acid in the treatment of burns, further investigation seemed desirable.

At this point it is worth recording recent experiments of Mueller (1942) who has shown that tannic acid (124 mg. daily) given by mouth to rats produces toxic symptoms. Diminished growth as a result of feeding tannic acid to rats and chicks has also been recorded (Lease and Mitchell 1940, Ringrose and Morgan 1940).

TABLE I—TOXICITY OF TANNIC ACID AND SODIUM TANNATE AFTER INTRAVENOUS INJECTION INTO MICE

Dose (mg.)	Animals	Dead in 48 hr.	Comment
Tannic acid			
5	2	2	Died instantly.
2·5	10	10	,, ,,
1·2	9	8	,, ,,
0·6	6	1	2 given 2nd injection of 0·6 mg.; both dead in a further 24 hr.
0·3	4	0	2 given 2nd injection of 0·3 mg.; both dead in a further 24 hr.
Sodium tannate			
1·2	6	4	
0·6	3	0	All given 2nd injection of 0·6 mg.; all dead in a further 24 hr.
0·3	3	0	All given 2 further injections of 0·3 mg. at 24-hr. intervals; all alive 48 hr. after last injection.

Impaired liver function has also been reported after burns (Boyce and McFetridge 1938b, Wolff et al. 1940, Thompson and Wilkinson 1940, and Abbott and Holden 1942). Here, however, it may be difficult to differentiate the effect of tannic acid from that of the anæsthetic which is known to depress the function of the liver (Boyce and McFetridge 1938a and Thompson and Wilkinson 1940).

In the present study the experimental work of Wilson on the toxicity of tannic acid has been confirmed. From the outset it became clear, however, that the degree of toxicity depended to a great extent upon the method of administration. Thus 20 mg. given intravenously killed a guineapig within a few minutes, whereas 1·6 g. intramuscularly failed to kill guineapigs within 24 hours. It was therefore obviously essential to determine whether tannic acid was absorbed from a freshly burnt skin surface.

The difficulty of producing in an experimental animal a suitable surface for the application of tannic acid probably explains why this question has not been previously investigated. As previously reported (Leach, Peters and Rossiter 1942), it has been found possible to produce such a surface in guineapigs. If a burn is produced by direct contact at a temperature of 60–70° C for 1 minute, the epidermis becomes detached and can be wiped away leaving exposed the raw moist dermis which may readily be tanned.

In an attempt to show whether or not tannic acid was absorbed, use was made of 3 staining reactions described

TABLE II—TOXICITY OF TANNIC ACID AND SODIUM TANNATE AFTER INTRAVENOUS INJECTION INTO GUINEAPIGS

Dose (mg.)	Result	Comment
Tannic acid		
200	Died instantly	..
20	Died	..
20	Died } in 10 min.	..
20	Died	..
20	Died in 24 hr.	..
10	Survived	Killed 24 hr.
10	Survived	Survived further dose (5 mg.) 24 hr.
5	Survived	Survived further dose (10 mg.) 24 hr.
Sodium tannate		
40	Died in 10 min.	..
20	Died in 24 hr.	..
20	Survived	Killed 14 hr.
20	Survived	Survived 24 hr. after 2 further
20	Survived	doses (20 mg.) 24-hrly.

below. Tissues near the burned area, œdema fluid and internal organs were examined in this way.

Experiments

Mice (20–25 g.), rats (150–200 g.) and guineapigs (600–800 g.) were used in these experiments.

Method of burning.—Burns suitable for the application of tannic acid were produced by a method similar to that described by Leach and his colleagues (1942). A 250 ml. beaker filled with water at 70–80° C. was firmly applied to the skin of a clipped anæsthetised guineapig for ½ minute. The burned area was then denuded of epithelium by rubbing it with moist cotton-wool. When tannic acid was used a 20% solution was applied with wool pledgets 3 times within the 2 hours immediately after the burn. By the end of 24 hours a hard dry black scab had formed. In other animals left untreated after removal of the epithelium a firm brown scab formed also within 24 hours.

Detection of tannic acid.—Small pieces of tissue (skin, muscle, liver, kidney, lung) and cotton-wool soaked in œdema fluid were dropped into solutions of staining reagents in watch-glasses. The following solutions were used:—

Ferrous sulphate 20%. A similar method was used by Wilson and has been employed in the past for the detection of tannic acid in plants (Gardiner 1884).

Vanadium chloride 1%. This reagent, which like iron produces a dark coloration in the presence of tannic acid, has also been used to detect tannic acid in plant tissue (Cavazza 1908). Tests (a) and (b) were read after 1 hour.

Nessler's reagent. In the presence of tannic acid this reagent produces a dark coloration (Moore 1890). In contrast to the preceding reactions the colour is produced rapidly and readings were taken after 5 minutes, the excess Nessler's reagent having first been washed away with distilled water.

The three methods gave similar results and their sensitivity is approximately the same. It was possible to detect tannic acid in a 1 : 100,000 dilution of a 20% solution (2 parts per million). Solutions of many other readily available metallic salts were tried but none was so sensitive. These reactions are also given by some of the breakdown products of tannic acid (e.g., gallic acid).

TABLE III—MORTALITY AFTER INTRAMUSCULAR INJECTION OF TANNIC ACID AND SODIUM TANNATE INTO RATS AND MICE

Dose (mg.)	Preparation	Animals	Dead in 24 hr.	Comment
Rats				
400	Tannic acid	12	0	4 killed 24 hr. to 8 days later. Rest survived 14 days.
400	Sodium tannate	10	5	3 survivors killed 24 hr. to 8 days later. Rest survived 14 days.
Mice				
100	Tannic acid	4	1	Rest killed at 24 hr.
100	Sodium tannate	4	2	Rest killed at 24 hr.

Results

(A) TOXICITY OF TANNIC ACID AND SODIUM TANNATE

Tannic acid is a poorly characterised substance, and therefore the toxicity of different commercial samples may vary to some extent. The preparation used in these experiments was that supplied by British Drug Houses Ltd.

Intravenous injections.—Tables I and II give a summary of the results of injecting solutions of tannic acid and sodium tannate into the tail-veins of mice and the ear-veins of guineapigs. The total volume of fluid injected was 0·25 ml. The animals were observed for 48 hours after injection and all recorded deaths fell within this period. From these results it can be seen that tannic acid is almost equally toxic for mice and guineapigs; the fatal dose is approximately 40 mg. per kg. of body-weight. Sodium tannate appeared to be equally toxic for mice but slightly less so for guineapigs.

Intramuscular injections.—It was soon apparent that animals could withstand much larger doses if these were given intramuscularly. This may be due to the fact that both tannic acid and sodium tannate being irritants give rise to an acute inflammatory reaction which will delay their absorption. In this connexion, it is interesting to note that sodium tannate appeared to be more toxic for rats, presumably because it is less irritating and therefore more easily absorbed (table III). Rats receiving doses of 400 mg. tannic acid survived. Some mice survived 100 times the fatal intravenous dose of tannic acid and sodium tannate, and 3 guineapigs were alive and well 24 hours after receiving 80 times the fatal intravenous dose of these substances.

(B) TANNIC ACID ON A FRESHLY BURNED SURFACE

Guineapigs were burned as previously described. The most suitable burn appeared to be one involving about a

quarter of the body surface and situated on the belly of the animal; from these burns substances giving the tannic acid reaction were absorbed more readily (see section C) than from burns on the back of the animal. Burns of a third or more of the body-surface often proved fatal within the first 24 hours.

Four groups of guineapigs were burned in this way. One group had the lesions tanned by 3 applications of 20% tannic acid within the 2 hours immediately following the burn; one was tanned by 6 applications of 5% tannic acid within 2 hours of burning and 3 applications on each of the following 2 days; one had normal saline applied as often as the 5% tannic acid and one received no treatment. The higher mortality figures for the animals treated with tannic acid is of interest (table IV), but more significant was the difference in general condition of surviving animals. Animals treated with tannic acid appeared worse, and lost, on the average, nearly twice as much weight as untreated animals during the 7 days succeeding the burn (table V and figure). This difference is statistically significant ($t = 2{\cdot}88$; for $P = 0{\cdot}01$, $t = 2{\cdot}78$) and all the more so, when it is borne in mind that table V and the figure do not include animals which died within the first 7 days of the experiment, more of which were in the treated than in the untreated group. Thus the application of tannic acid to burned guineapigs may affect adversely both the mortality-rate and the general condition of the surviving animals. It must be stressed, however, that the area of body surface burned is important; with a larger area the animals die no matter what local application is made to the burn and with a smaller area the above results cannot be obtained.

(C) TANNIC-STAINING SUBSTANCES IN THE TISSUES

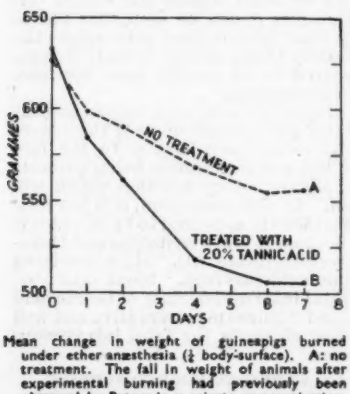
Tannic acid was tested for as described above.

After intravenous injection.—After the injection of fatal doses of tannic acid or sodium tannate the livers of mice always gave a positive reaction. It was also possible to obtain the tannic acid reaction in the livers of those animals killed 24–48 hours after the injection of a non-fatal dose. On the other hand, in guineapigs, while it was possible to obtain the reaction in the liver, kidney, and lungs after a large fatal dose (200 mg.), positive findings were less constant after small fatal doses (20 mg.). Non-fatal doses gave no reaction at all. Sodium tannate in doses of 20 and 40 mg. was readily recognisable in the tissues. This confirms the observation of Wilson that positive staining reactions are more readily detectable after injections of sodium tannate than after equivalent doses of tannic acid.

TABLE V—CHANGES IN WEIGHT OF GUINEAPIGS BURNED UNDER ETHER ANÆSTHESIA (A QUARTER OF BODY SURFACE)

Dressing applied	Animals	Av. init. weight (g.)	Av. final weight (g.)	Mean change in weight (g.)	SE of mean
None	14	626	556	− 70	± 12
TA 20% 3 times in first 2 hr. ..	14	632	506	− 126	± 15

SE = standard error.



Mean change in weight of guineapigs burned under ether anæsthesia (¼ body-surface). A: no treatment. The fall in weight of animals after experimental burning had previously been observed by Peters in a private communication. B: treated with 3 applications of 20% tannic acid in the 2 hours after burning.

After intramuscular injections of tannic acid and sodium tannate positive reactions were obtained with the liver (the only organ tested) of rats and with the liver, kidney and lungs of mice. There was no constant difference between the animals receiving tannic acid and those receiving sodium tannate. In addition, little difference was found between those animals that survived the injection and were killed later, and those that died within 24 hours of receiving the injection. On the other hand, there was no tannic acid detectable in the tissues of guineapigs that received 1·6 g. tannic acid or sodium tannate and were killed 24 hours later.

TABLE IV—MORTALITY OF GUINEAPIGS BURNED (A QUARTER OF BODY SURFACE) UNDER ETHER ANÆSTHESIA

Dressing applied	Animals	Dead in 7 days	Survived	Mortality %
None	18	1	17	5·5
Normal saline, 6 times in first 2 hr., then 3 times on each of 2 subsequent days	12	0	12	0
TA 20%, 3 times in first 2 hr.	18	4	14	22
TA 5%, as normal saline above	12	2	10	17

Mortality without tannic acid (TA) = 3·5%
Mortality with tannic acid = 20%

After application of tannic acid to burned surface.—Because of the significance of absorption of tannic acid from burned areas the results of these investigations are reported in greater detail (table VI). When a 20% solution of tannic acid was applied to a large burn (a third

TABLE VI—STAINING TESTS FOR TANNIC ACID IN TISSUES OF GUINEAPIGS BURNED AND TREATED WITH 3 APPLICATIONS OF 20% TANNIC ACID IN THE 2 HOURS AFTER BURNING.

The plus signs give some indication of the strength of the reaction.

Area of body surface burned	Site	Died or killed	Treatment	TANNIC ACID (TA)						
				Liver	Lungs	Kidney	Ant. muscle	Post. muscle	Skin	Œdema fluid
¼	Back & belly	D. 24 hr.	TA	+	+	+	+ + +	+ +	+ + +	−
¼	,,	,,	,,	±	+	+	+ +	+	+ + +	−
¼	,,	,,	Nil	0	0	0	0	0	0	−
¼	,,	,,	TA	+	+	+	−	+	+ + +	−
¼	,,	,,	,,	±	+	+	+ + +	+ +	+ + +	−
¼	,,	,,	,,	+	+	+	+ + +	+ +	+ + +	−
¼	,,	,,	Nil	0	0	0	0	0	0	−
¼	Back	K. 24 hr.	TA	0	0	0	−	±	+ + +	−
¼	,,	,,	Nil	0	0	0	−	0	0	−
¼	Belly	,,	TA	0	0	0	+ + +	0	+ + +	−
¼	,,	,,	,,	0	0	0	+ +	0	+ + +	−
¼	,,	,,	Nil	0	0	0	0	−	0	−
¼	,,	,,	,,	0	0	0	0	−	0	−
¼	,,	D. 4th day	TA	0	0	0	+ + +	0	+ + +	−
¼	,,	K. 4th day	,,	0	0	0	+ + +	0	+ + +	−
¼	,,	,,	Nil	0	0	0	0	0	0	−
¼	,,	D. 6th day	TA	0	0	0	+ + +	0	+ + +	−
¼	,,	,,	Nil	0	0	0	0	0	0	−
¼	,,	K. 1 wk.	TA	0	0	0	+ + +	0	+ + +	+ + +
¼	,,	,,	,,	0	±	0	+ + +	0	+ + +	+ + +
¼	,,	,,	Nil	0	0	0	0	0	0	0
¼	,,	K. 2 wk.	TA	0	0	0	+ +	0	+ + +	+ + +
¼	,,	,,	,,	0	±	0	+	0	+ + +	+ + +
¼	,,	,,	Nil	0	0	0	0	0	0	0
¼	Back	K. 24 hr.	TA	0	0	±	−	+ +	+ + +	−
¼	,,	,,	,,	0	+	±	−	+ +	+ + +	−

to two-thirds of the body surface) from which the animal succumbed within 24 hours, a positive tannic acid reaction could be obtained with the liver, lungs, kidney and muscle beneath the burnt area; and of course, from the tanned skin. Control animals burnt but not tanned gave no such reactions.

When the burns were smaller (a sixth to a quarter of the body surface) there was normally no staining of the internal organs but always staining of the muscles deep to the burn. This staining was greater when the burn was on the ventral rather than the dorsal surface of the trunk. A factor that might have accounted for this was the slower rate of drying of the coagulum on the belly wall. At the same time there was a considerable accumulation of œdema fluid between the skin and muscle. This had sometimes clotted and on occasions attained to a thickness of 1 cm. When tested this fluid invariably gave positive reactions for tannic acid. Fluid from untreated burns was always negative.

It is clear, therefore, that some substance giving the tannic acid reaction can penetrate burned skin to reach the underlying muscle and intervening œdema fluid, and some, at least, is absorbed. The fact that it was not detected in the organs of all guineapigs that died after having had tannic acid applied to the burn does not exclude the possibility that the tannic acid exerted a toxic action. As has already been noted, none could be detected in guineapigs that had received a fatal intravenous injection (20 mg.). Similarly, there is no reason to exclude a possible part played by absorbed tannic acid in contributing to the greater weight-loss observed with the tanned animals.

TABLE VII—HISTOLOGICAL APPEARANCE OF LIVER OF MICE AFTER INTRAVENOUS INJECTION OF TANNIC ACID

Dose mg.	Died or killed	Report
2·5	D. in 24 hr.	Extensive centrolobular and midzonal coagulation necrosis infiltrated with polymorphs and lymphocytes. Congestion; hæmorrhages along veins in places. Most of liver necrotic. Bile-ducts normal.
1·25	D. in 24 hr.	Post-mortem change present, but massive coagulation necrosis of liver. Congestion + + (much formalin pigment). Massive patches of hæmorrhage in parts. One section shows atrophy of liver trabeculæ with cellular infiltration.
0·6	K. at 48 hr.	Massive liver necrosis specially along hepatic and central veins; break-up of cells; chromatolysis; little infiltration with leucocytes; peripheral cells of lobules show cloudy swelling; no hæmorrhage. Bile-ducts normal.
0·6	K. at 5 days	Regeneration of liver cells going on actively. Remnants of extensive centrolobular necrosis; some infiltration with lymphocytes and macrophages; mitoses in liver cells.

(D) HISTOLOGICAL CHANGES IN LIVER

Sections of liver tissue were prepared from many of the animals, and the authors are grateful to Prof. G. R. Cameron for the reports on the sections (tables VII, VIII, and IX) and for the following comments:

After intravenous injection of tannic acid into mice (table VII) "severe liver damage is seen in all cases—centrolobular becoming confluent." After intramuscular injection of tannic acid and sodium tannate to rats (table VIII) "there is slight though definite liver damage after 1 day, but not thereafter." After intramuscular injections of tannic acid and sodium tannate to guineapigs (table VIII) "there is marked liver damage with tannic acid but less marked with sodium tannate (but only one animal in each case, so no general conclusion can be made)." After burning (table IX), "there is no doubt that the livers of the tanned animals of group A have been damaged though not to a severe degree, whereas the animals that were burned only show very mild changes. Of the tanned animals in group B one does show smallish areas of actual necrosis, but the other has a normal liver. It seems that when the animals are allowed to live longer after tanning the liver changes are somewhat more severe, though, of course, there would be a limit to this period, for regeneration soon sets in."

It is thus seen that after intravenous injection of tannic acid there is definite liver necrosis. After intramuscular injection the damage is less severe but quite definite. After application of tannic acid to a burned surface the extent of damage though slight, is definitely more severe than that seen in the controls that were burned only.

TABLE VIII—HISTOLOGICAL APPEARANCE OF LIVER AFTER INTRAMUSCULAR INJECTION OF TANNIC ACID AND SODIUM TANNATE

Dose (mg.)	Preparation	Dead or killed	Report
Rats			
400	TA	K. at 24 hr.	Much cloudy swelling and congestion only.
400	TA	K. at 4 days	Normal; much glycogen.
400	Sod. tannate	K. at 24 hr.	Cloudy swelling only.
400	Sod. tannate	K. at 4 days	Normal.
Guinea pigs			
1600	TA	K. at 24 hr.	Extensive centrolobular coagulation-necrosis throughout, sometimes of whole lobules. Cloudy swelling + +. Bile-ducts normal. Very little glycogen.
1600	Sod. tannate	K. at 24 hr.	Cloudy swelling + + +. Congestion + + +. Some areas of necrosis. Very little glycogen.

Discussion

The injection experiments of section A make it clear that tannic acid is a toxic substance. This confirms the views of Wilson (1942). The staining reactions described in section C show that some substance giving the tannic acid reactions is absorbed when tannic acid is applied to a burned surface. That the application of tannic acid to such a burned surface is harmful is shown by the increased mortality and weight-loss that follows the application (section B). The histological appearance of livers after injection or application of tannic acid make it probable that some of the ill effects following tannic acid administration arise from liver damage.

This experimental evidence, taken in conjunction with the previously noted fact that severe liver necrosis in human cases of burns has only been reported since the introduction of the tannic acid technique, and then only when tannic acid was applied, strongly suggests that tannic acid should not be used indiscriminately on large burned areas. Impressive figures have been published showing the reduction in the mortality figures from burns since the introduction of coagulation therapy. It might be pointed out, however, that of late equally impressive results have been obtained without the use of tannic acid (Mason 1941, Allen and Koch 1942, Siler 1942, and Siler and Reid 1942).

TABLE IX—HISTOLOGICAL APPEARANCE OF LIVERS OF GUINEA-PIGS BURNED UNDER ETHER ANÆSTHESIA (A QUARTER OF BODY SURFACE)

When killed	No treatment	Treated with 6 applications of 5% tannic acid within 2 hours of burning
After 3 days	1. Mild centrolob. vacuolar degen. and fatty change. 2. Mod. centrolob. vacuolar degen.; no fat. 3. Sl. centrolob. vacuolar degen.; no fat.	1. Considerable centrolob. degen.; no necrosis; glycogen loss; slight fatty degen. 2. Marked centrolob. degen.; no necrosis; glycogen loss; mod. fatty degen. 3. As 2.
After 2 days	1. Normal; much glycogen; no fat. 2. As 1. 3. Sl. degen. in centrolob. zone.	1. Occas. areas of necrosis with polymorph infiltrat.; mod. degen. in centrolob. zone; sl. fatty degen. 2. Normal; no fat.
After 1 day	1. Sl. cloudy swelling and loss of glycogen in centrolob. zone. 2. Normal. 3. As 1.	1. Normal. 2. Sl. cloudy swelling; loss of glycogen. 3. Much glycogen.

Normal controls: 1. Normal. Much glycogen. 2. As 1. 3. As 1.

Summary

Tannic acid and sodium tannate when injected intravenously were fatal to mice and guineapigs in doses of the order of 40 mg. per kg.

The fatal intramuscular dose was much greater. For rats sodium tannate given intramuscularly was more toxic than tannic acid.

Guineapigs burned to the extent of a quarter of the body surface and treated with tannic acid had a higher mortality and greater loss in weight than similar animals burned to the same extent but not treated with tannic acid.

After intravenous and intramuscular injection of tannic acid the internal organs of mice, rats and guineapigs gave a positive tannic-staining reaction. After application of tannic acid to large (one to two-thirds of the body surface) fatal burns in guineapigs, the liver, lungs, kidney and muscle beneath the burns gave a positive test. With smaller (a quarter of the body surface) non-fatal burns the test was negative for the internal organs but positive for the muscle deep to the burn and the œdema fluid separating the muscle from the burned skin.

After intravenous injection of tannic acid to mice severe liver damage was seen histologically. After intramuscular injection of tannic acid or sodium tannate there was slight though definite liver damage. After application of tannic acid to the raw area produced by burning guineapigs to the extent of a quarter of the body surface there was slight liver damage, greater than that seen in untreated animals similarly burned.

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DURING the year ended 30.vi.43 there was little air raiding in Scotland but we learn from the Health Department's summary report that the services for the care of the homeless are still being extended and improved. Rest centres have increased in number by 200 to 2700 with accommodation for 300,000 people. There are now 220 information centres, with a staff of over 5000 voluntary workers, to deal with inquiries if need should arise. Rehearsals for these centres are being held.

LIVER FUNCTION IN RABBITS AFTER INJECTION OF TANNIC ACID

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EVIDENCE relating to the toxicity of tannic acid has been summarised by Barnes and Rossiter (1943). Liver damage after tannic acid injection has been demonstrated histologically by Wells, Humphrey and Coll (1942) and by Cameron, Milton and Allen (1943). In this paper we shall show that there is also impaired liver function, as measured by the intravenous galactose-tolerance test of King, Harrison and Delory (1940). Recently Robinson and Graessle (1943) have described a decrease in bromsulphalein excretion after injection of tannic acid into rabbits.

Method.—The intravenous test (1·0 gramme galactose per kg. body-weight) was carried out on rabbits as described by King et al. (1940). The blood galactose was determined by the ferricyanide method, after previous removal of the glucose by yeast fermentation. Tests on normal rabbits gave values, and a degree of reproducibility, not unlike that shown in table III of the paper by King and his colleagues.

TABLE I—GALACTOSE TOLERANCE IN RABBITS AFTER SUBCUTANEOUS INJECTION OF 5% TANNIC ACID

Rabbit (weight in kg.)	Dose (mg./kg. body-wt.)	Time of test (before or after injection)	Blood galactose (mg./100 ml.) 1 hr.	3 hr.
I (2·2)	100	Before	86	0
		1 day after	79	4
		2 days after	92	2
G (2·3)	100	Before	89	0
		1 day after	120	0
		2 days after	89	5
		4 days after	98	0
D (2·8)	250	Before	129	4
		1 day after	224	47
		2 days after	210	5
		4 days after	150	0
		7 days after	134	3
F (2·2)	250	Before	48	10
		1 day after	81	23
		2 days after	40	10
		4 days after	85	0
B (3·2)	500	Before	97	14
		1 day after *	144	87
H (2·2)	500	Before	102	12
		1 day after	110	26
		2 days after	164	36
		4 days after	135	26
		7 days after	87	9
R (2·4)	500	Before	100	7
		1 day after	83	26
		2 days after	99	3
J (3·5)	750	Before	108	14†
		1 day after	108	38
		2 days after	127	36
		4 days after	144	51
		7 days after	87	6
Q (2·3)	750	Before	110	16
		1 day after	100	20
		2 days after	83	5
S (2·3)	750	Before	108	22
		1 day after	97	30
		2 days after	83	0

* Died 5 days after injection. † Mean of 3 tests.

Results.—Typical results obtained after subcutaneous injection of 5 per cent. tannic acid are given in figs. 1–4. Injections of 100 mg./kg. caused only slight changes in the galactose tolerance, but larger doses caused a marked impairment. This depression of function was usually greatest on the first or second day after the injection and had frequently disappeared within 5 days. The degree of impairment is similar to that reported by King and his colleagues after injection of carbon tetrachloride. More detailed results are given in table I. For doses greater than 100 mg./kg. there seemed little correlation between the dose of tannic acid and the degree of impairment.

Results after intravenous injection of tannic acid were more variable (table II). Frequently small doses (5–10 mg./kg.) failed to cause any liver damage as measured by the test, while larger doses (20 mg./kg.) were immediately fatal. Sometimes, however, there was an impairment of function (figs. 5 and 6) as seen after subcutaneous injection.

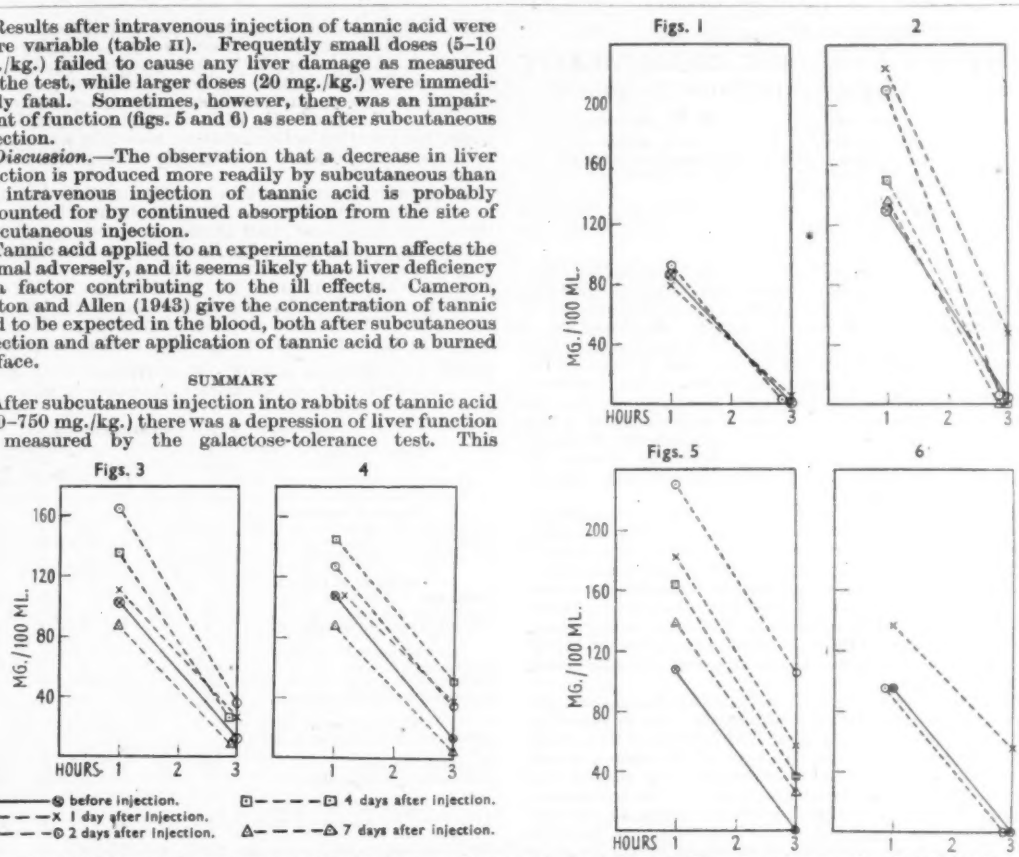
Discussion.—The observation that a decrease in liver function is produced more readily by subcutaneous than by intravenous injection of tannic acid is probably accounted for by continued absorption from the site of subcutaneous injection.

Tannic acid applied to an experimental burn affects the animal adversely, and it seems likely that liver deficiency is a factor contributing to the ill effects. Cameron, Milton and Allen (1943) give the concentration of tannic acid to be expected in the blood, both after subcutaneous injection and after application of tannic acid to a burned surface.

SUMMARY

After subcutaneous injection into rabbits of tannic acid (100–750 mg./kg.) there was a depression of liver function as measured by the galactose-tolerance test. This impairment of function has also been observed after intravenous injection of smaller (5–10 mg./kg.) doses of tannic acid.

We wish to thank Prof. R. A. Peters, FRS, and Prof. G. R. Cameron for their interest in this work. Thanks are also due to Miss J. Jenkins for valuable technical assistance. One of us (E. J. C.) is indebted to the Medical Research Council, and one (R. J. R.) to the Carnegie Trustees, for a personal grant. The Medical Research Council have also contributed towards the cost of this investigation, which was carried out on behalf of the burns subcommittee of the War Wounds Committee.



Figs. 1–6—Galactose tolerance tests in rabbits after injection of tannic acid. Fig. 1, Rabbit I, 100 mg./kg. subcutaneously. Fig. 2, Rabbit D, 250 mg./kg. subcutaneously. Fig. 3, Rabbit H, 500 mg./kg. subcutaneously. Fig. 4, Rabbit J, 750 mg./kg. subcutaneously. Fig. 5, Rabbit E, 5 mg./kg. intravenously. Fig. 6, Rabbit W, 20 mg./kg. intravenously.

TABLE II—GALACTOSE TOLERANCE IN RABBITS AFTER INTRAVENOUS INJECTION OF TANNIC ACID

Rabbit	Dose (mg./kg. body-wt.)	Time of test (before or after) injection)	Blood galactose (mg./100 ml.) 1 hr.	3 hr.
M (2·1)	2	Before	108	0
		1 day after	82	0
		2 days after	57	6
E (2·7)	5	Before	108	2*
		1 day after	182	57
		2 days after	230	106
		4 days after	164	36
		7 days after	138	26
L (1·8)	5	Before	108	17
		1 day after	104	2
		2 days after	61	0
I (2·2)	10	Before	89	0*
		1 day after	102	7
		2 days after	89	0
G (2·3)	10	Before	98	0
		1 day after	79	2
		2 days after	112	0
W (2·3)	20†	Before	95	0
		1 day after	137	55
		2 days after	95	0

* Mean of 2 tests. † 2 other rabbits with this dose died within 1 hour.

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BURSARIES FOR PSYCHOLOGICAL NURSING.—Sir Felix Cassel, founder of the Cassel Hospital for functional nervous disorders, has endowed bursaries for state-registered nurses who wish to study modern methods of psychological treatment. The holders of the bursaries will receive a free course of training, which will occupy 16 weeks, and a weekly honorarium of £4 10*s*. Preliminary experience of the nursing of the neuroses will be given at the Cassel Hospital, supplemented by lectures and seminars from the medical staff of the hospital. The nurse will then spend 4 weeks in London under the direction of the Provisional National Council for Mental Health, when she will see something of the extent of the neurosis problem and of the agencies which exist for its solution. She will then return to the Cassel Hospital for a period of general revision and to study occupational therapy as it is applied in psychological medicine. The bursary does not qualify for a Cassel Hospital certificate of proficiency which is only awarded after twelve months' work at the hospital. Sir Farquhar Buzzard is chairman of the committee administering the bursaries, which includes representatives of the Royal College of Nursing, the Association of Hospital Matrons and the Council of Mental Hygiene. Further particulars may be had from the secretary of the committee, Ash Hall, Bucknall, Stoke-on-Trent.

COMBINED ACTION OF ANTITOXIN AND LOCAL CHEMOTHERAPY ON *CL. WELCHII* INFECTION IN MICE *

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IN earlier communications (McIntosh and Selbie 1941, 1942, 1943) it has been shown that chemotherapeutic substances, particularly penicillin and proflavine, are of considerable value in preventing the development of experimental gas-gangrene infection in mice when these remedies are applied locally in the early stages of the disease. In the later stages of the infection, however, when the organisms have invaded the blood-stream, the local application of these drugs is apparently of much less value. This paper describes experiments designed to test whether any advantage could be gained by supplementing antitoxin with local chemotherapy especially in the later stages of the disease.

Details of the technique used in these experiments were given in the earlier communications. The infecting dose of washed *Cl. welchii* (strain B.S.I. No. 186) is standardised to contain at least 100 lethal doses and is suspended in 2·5% calcium chloride immediately before intramuscular injection. Local chemotherapy is administered by injecting a solution of the drug at the site of infection in the right thigh. Antitoxin is given by injecting the required dose in 0·2 c.cm. of saline subcutaneously in the right flank.

Preliminary experiments confirmed the finding of other workers that antitoxin, injected at the time of infection, protects all mice infected with fluid cultures of *Cl. welchii*. The value of antitoxin in this type of infection is due to the neutralisation of the preformed toxin in the fluid culture which would otherwise produce the lowering of oxygen tension necessary for the initiation of gas-gangrene infection. In the experimental technique described here, however, the infection is initiated by the presence of calcium chloride and is thus more comparable to conditions in man. In this type of infection antitoxin is not so consistently effective, as is shown in table I, where the value of treatment is assessed by calculating the average number of whole days survived, obtained by

TABLE I—IRREGULAR EFFECT OF ANTITOXIN ON MICE INFECTED WITH WASHED *Cl. welchii* AND CALCIUM CHLORIDE

Dose of antitoxin (units)	No. of expts.	No. of mice	Deaths on day: 1	2	3	Survived 3 days	Av. no. of days survived at 3 days
2·5	5	42	0	0	1	41	3·0
	5	30	7	11	4	8	1·4
5	1	12	2	0	1	9	2·4
	1	12	10	2	..	0	0·2
10	1	12	0	0	0	12	3·0
	1	12	11	1	..	0	0·1

Antitoxin was administered subcutaneously immediately after infection.

dividing the total number of whole days survived in each group of mice by the number of mice in the group; the mortality for only 3 days is considered since the great majority of mice surviving this period survive indefinitely. From the results in table I it is evident that antitoxin alone is too irregular in its action to be a satisfactory prophylactic agent against this type of experimental infection where the initiation of infection is not determined by the presence of preformed toxin.

In table II are shown six experiments in which the effect of combined treatment with antitoxin and local chemotherapy is compared with the effect of antitoxin or local chemotherapy alone at various stages of the infection. It will be seen that combined treatment gave higher survival-times than treatment with either measure alone at all stages of the infection up to 6 hours after infection. This is especially well seen in expt. 2 where the dose of antitoxin was cut down sufficiently to allow only one mouse to survive after the first day and where proflavine was apparently without effect; in spite of the negligible curative action of these remedies when given separately they had a considerable saving effect when given in combination.

The results are summarised in table III where it will be seen that the advantageous effect of adding local chemotherapy to treatment with antitoxin was greatest when treatment was commenced at 4 and 6 hours after infection (expts. 5 and 6). This is remarkable because the organisms have already invaded the blood-stream at this time with the result that local chemotherapy alone has very little effect (McIntosh and Selbie 1942, 1943). It is also shown in table III that, irrespective of the times when

TABLE II—COMBINED ACTION OF ANTITOXIN AND LOCAL CHEMOTHERAPY ON *Cl. welchii* INFECTION IN MICE

Experiments	No. of mice	Deaths on day: 1	2	3	Survived 3 days	Av. no. of days survived
1—*Immediate treatment*						
Antitoxin, 2·5 units	6	0	4	1	1	1·5
Proflavine, 0·5 mg.	6	1	1	1	3	2·0
Antitoxin and proflavine ..	6	0	0	1	5	2·8
2—*Treatment at 1½ hrs.*						
Antitoxin, 1·0 unit	6	5	1	..	0	0·2
Proflavine, 0·5 mg.	6	6	..	..	0	0
Antitoxin and proflavine ..	6	3	1	1	1	1·0
3—*Treatment at 2½ hrs.*						
Antitoxin, 2·5 units	12	4	4	1	3	1·3
Proflavine, 0·5 mg.	12	12	..	..	0	0
Antitoxin and proflavine ..	12	3	4	0	5	1·6
4—*Local treatment at 3 hrs.*						
Antitoxin, 2·5 units at 3 and 6 hrs.	12	1	2	1	8	2·3
Penicillin, 50 units	12	7	3	0	2	0·8
Antitoxin and penicillin ..	12	1	1	0	10	2·6
5—*Local treatment at 4 hrs.*						
Antitoxin, 2·5 units at 4 and 7 hrs.	12	9	2	1	0	0·3
Antitoxin and proflavine, 0·5 mg.	12	8	2	0	2	0·7
Antitoxin and penicillin, 50 units	12	4	3	0	5	1·5
6—*Treatment at 6 hrs.*						
Antitoxin, 5 units	12	8	4	..	0	0·3
Antitoxin and proflavine, 0·5 mg.	12	9	1	1	1	0·5
Antitoxin and penicillin, 50 units	12	7	1	0	4	1·1

treatment was given, the addition of local chemotherapy to antitoxin doubled the proportion of survivors and increased the average survival-time by 40%.

DISCUSSION

It has been shown by Henderson and Gorer (1940) that in intradermal infection with *Cl. septicum* in mice the combined action of oral sulphapyridine and antitoxin effects a saving of life much greater than would be expected from a mere summation; in *Cl. welchii* infection a noticeable synergic effect is produced but the evidence on this point is less clearly defined. Attempts to obtain similar results in conjunction with the experiments described here have so far failed. Thus, the addition of systemic therapy with sulphanilamide or penicillin to local chemotherapy or to combined treatment with antitoxin and local chemotherapy has not been advantageous and has occasionally tended to decrease the saving effect. This discrepancy, however, may be due to differences in the toxigenic and invasive powers of the strains of organisms used and in the type of experimental disease. All the evidence appears to indicate that both local and general chemotherapy are necessary adjuvants to antitoxin in the treatment of all stages of *Cl. welchii* infection.

The experimental results clearly show that measures directed towards dealing with the local infection are of great value even when the infection has become generalised. Such local measures would include full surgical toilet followed by the application of a chemotherapeutic agent. Until more effective remedies are available a finely ground mixture of 1% proflavine in sulphathiazole should be used (McIntosh and Selbie 1943). This mix-

* This work was done on behalf of the War Wounds Committee of the Medical Research Council.

TABLE III—SUMMARY OF EXPERIMENTS ON COMBINED ACTION OF ANTITOXIN AND LOCAL CHEMOTHERAPY ON *Cl. welchii* INFECTION IN MICE

Expts.	Treatment commenced (hours)	Treatment	No. of mice	Survived 3 days		Av. no. of days survived at 3 days
				No.	%	
1, 2, 3	0–2½	Antitoxin	24	4	17	1·0
		Antitoxin and proflavine	24	11	46	1·8
4	3	Antitoxin	12	8	67	2·3
		Antitoxin and penicillin	12	10	83	2·6
5, 6	4–6	Antitoxin	24	0	0	0·3
		Antitoxin and proflavine	24	3	13	0·6
		Antitoxin and penicillin	24	9	38	1·3
1, 2, 3, 4, 5, 6	0–6	Antitoxin	60	12	20	1·0
		Antitoxin and local therapy	84	33	39	1·4

ture is effective against *Cl. welchii*, *Cl. œdematiens* and *Cl. septicum*, the three main causal organisms of gas gangrene, and has the advantage of diminishing the local toxic effects of proflavine which are considerable when proflavine crystals are applied to healthy tissue in large amounts (Russell and Falconer 1943, Hawking 1943).

Our results also emphasise the importance of early treatment. Whether the therapeutic measures are chemotherapy or serum therapy or both, they should be initiated before serious deterioration of the tissues sets in, and the sooner the better. In our experimental disease in mice the limiting period appears to be 4 or 5 hours after the inception of infection. Thus the time factor is of the utmost importance in the treatment of anaerobic infections.

SUMMARY

Antitoxin treatment combined with local chemotherapy is more effective than antitoxin or chemotherapy alone in the treatment of *Cl. welchii* infection in mice.

The results indicate that all cases of gas gangrene should receive as soon as possible adequate doses of antitoxin combined with full local treatment.

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Medical Societies

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the fever hospital medical services group on June 18, with Dr. ANDREW TOPPING (LCC) in the chair, a discussion on

Administrative and Clinical Control of Diphtheria

was opened by Dr. J. A. SCOTT (Fulham), who said that before immunisation was practised in this country there were about 60,000 cases of diphtheria in England and Wales annually, of which 3000 died. Comparing this with an average of 600,000 births annually the risk of catching diphtheria before the age of fifteen was about 1 in 10. Active immunisation could not be expected to reduce the carrier-rate, which might even increase in partially immunised communities. Hence there was a fair chance of recovering diphtheria bacilli from swabs from immunised children, whether they were suffering from diphtheria or not. In Fulham over 3000 children were immunised during 1934–41, but the number had now increased to over 10,000. After a preliminary period pre-Schick testing was dropped but a post-Schick test was always performed. Among immunised children 22 cases had been notified, but the diagnosis was not confirmed in 6. Of the remaining 16 confirmed cases, 5 contracted diphtheria before full immunity could have developed. In 1 case, on whom there had been no post-Schick test, the attack was fatal. More than half of all children under fifteen in Fulham were now immunised, and the average number of cases of diphtheria per year had dropped from 350 to 50. A parallel decrease in incidence could also be shown for the County of London, where immunisation had been actively pursued in most boroughs since 1934. Dr. Scott encouraged the early admission to hospital of diphtheria cases without waiting for the results of bacteriological swabs, a policy justified by the rising mortality when serum administration was delayed. It was unusual for the doctor to be called in before the second or third day, which emphasised the need for prompt admission to hospital. Prompt admission entailed formal notification, in which the diagnostic error was high. Correction of notifications is not automatic and the information rarely filters through to the Registrar-General, whose figures are therefore incorrect. Thus the full effect of immunisation might be masked and a misleading impression given of the incidence of diphtheria in the immunised population. De-notification was not a simple problem, since parents were sometimes more inclined to blame the doctor for what they considered a wrong admission to hospital than to express gratitude for the caution he had displayed. Speaking of the possibility of early administration of antitoxin in the home Dr. Scott regretted that the average amount of serum issued to practitioners in his area amounted only to an 8000 unit dose for each five notified cases. Taking into account overcrowding, loss of employment among intimate home contacts and so forth, the proper solution was an easy system of hospital admission. Administratively, however, there was a need to correct preliminary notification figures in the light of the final diagnosis. Such a system would probably increase difficulties in hospitals with a shortage of isolation accommodation, but some relief might be expected from a decrease in the incidence of diphtheria. The admission of cases on a diagnosis of suspected diphtheria had much to commend it provided a reliable and prompt system of informing borough MOHs of the corrected diagnosis was evolved. The anti-vaccination societies would doubtless regard the correction of diagnosis as a further effort to mislead the public, but in everything connected with diphtheria and the great immunisation campaign scientific accuracy was all important and would provide the only answer the antivaccinationists needed.

Dr. NORMAN BEGG (LCC) said that the major problem of diphtheria in hospital was the disposal and management of doubtful cases. The disease always ranked high among those which tended to be erroneously diagnosed. In 1058 diphtheria admissions to the Eastern Hospital the diagnosis was not confirmed in 35·4%, compared with a diagnostic error of 13·3% in scarlet fever, 11·5% in measles and 10·7% in whooping-cough. The commonest mistake was to confuse diphtheria with other throat infections, particularly those due to the hæmolytic streptococcus. In rather less than half of all certified cases it was possible to arrive at a presumptive diagnosis of diphtheria on admission. This meant that for every bed provided for diphtheria in an open ward at least one other bed must be available for isolation and investigation of doubtful cases. At present isolation accommodation to this extent could only be provided in barrier-nursing wards. In investigating doubtful cases the clinical findings were easily the most important. Too much stress was laid on bacteriological examination, which was often incomplete unless it included full identification of the diphtheria bacillus and specific examination for hæmolytic streptococci and Vincent's organisms. In the large group of admissions where the balance of clinical evidence was against diphtheria positive bacteriological findings might be misleading unless the state of the patient's immunity was also revealed by Schick test or estimation of blood antitoxin. Thus in doubtful cases the three main investigations often had an interrelated importance. Among Dr. Begg's 1058 diphtheria admissions the biggest diagnostic error—50·5%—occurred in cases referred from the outpatient department of general hospitals, whereas general practitioners' cases had a diagnostic error of 33·1%. An acute aspect of the problem was the readiness with which diphtheria was diagnosed and formally certified in immunised children. In a series of 66 such admissions, diphtheria was confirmed in only 13 cases, and 4 of the cases had contracted diphtheria before immunisation was complete. In the single fatal case, a tracheotomised one, details of immunisation, which

had been done in an evacuation area, were uncertain. To put no hindrance on admitting suspect diphtheria cases to hospital would encourage early admission and do away with the need for attaching a definite certificate when in doubt about the diagnosis. But it would not result in more accurate diagnosis in the home, nor solve the problem of shortage of isolation accommodation. He favoured the setting up of a clinical consultant service in infectious diseases closely linked with a good laboratory service—all to be available to see patients in the home, or in the hospital outpatient or inpatient department. Consultation should be sought, not in isolated cases of doubt but in all cases who would normally be sent to hospital.

Dr. ROBERT CRUICKSHANK (LCC) said that clinical diagnosis was clearly not easy, for 5–6 out of every 10 notified cases admitted to the North-Western Hospital were not diphtheritic infections. Much unnecessary trouble, both to parents and to hospital superintendents, would be avoided if doubtful cases were given an injection of antitoxin at home, and a swab sent for examination by a reliable laboratory. Many doctors were still unaware of the refinement in antitoxin which allowed an adequate dose for an early doubtful case to be given in 2–3 c.cm. with the minimum risk of reaction. An accurate laboratory diagnosis of diphtheria could only be obtained by the use of a tellurite medium, and culture on blood-agar was required to identify streptococcal infection. The Loeffler slope was still useful for early diagnosis, but it missed up to 30% of clinical infections and gave false-positive cultures with swabs from ear, nose or wound. The tellurite medium, on the other hand, besides checking the clinical diagnosis identified the infecting type as gravis, intermedius or mitis, eliminated false positives and minimised the need for virulence testing since all gravis and intermedius strains are toxigenic. Identification of type was also of prognostic value, paralytic complications being more common (10–15%) with gravis and intermedius than with mitis (4%). Use of the tellurite medium in the discharge of patients from hospital had been criticised on the grounds that it encouraged the unnecessary detention of the patient in hospital just because he had a few diphtheria bacilli in his throat. A comparative analysis of tellurite and Loeffler cultures from dismissal swabs showed that only a fifth of the patients were kept longer in hospital because of positive cultures on the tellurite medium when the Loeffler cultures were negative; of these more than half were ready for discharge within 2 weeks. Persistence of the carrier condition was due to unhealthy mucous membranes, reinfection and secondary streptoccocal infection. The detection of carriers was also facilitated by the tellurite medium, which, besides being less laborious, allowed a correct and quantitative report within 2 days, and by identifying the infecting type helped to trace the source of infection. Swabs for discharge and for detection of carriers must always be taken from nose as well as throat. Knowledge of the relative incidence of the infecting types was essential for the study of the epidemiology of diphtheria.

The CHAIRMAN thought the public could be educated to appreciate the practitioner's action in sending a doubtful case to hospital even if the diagnosis was not confirmed. The difficulty of adequate isolation accommodation was not insurmountable; we might have to aim at 60% of single-bedded units in the future. He favoured the provision of a consultant service and a wider use of the senior staff of fever hospitals in field epidemiology.

Dr. VICTOR FREEMAN (Islington) said that in large-scale immunisation labour could be saved by omitting the pre-Schick test in children up to nine years. He had had only 6 confirmed cases of diphtheria in his area among fully immunised children, and only 1 of these had a severe attack. He asked for full and accurate record-keeping in all areas undertaking diphtheria immunisation.

Dr. GUY BOUSFIELD (Camberwell) had not encountered one death from diphtheria in a fully immunised child during fourteen years. He strongly favoured frequent control of Schick-test toxin on primary cases and thought that some failures in immunisation were attributable to faulty post-Schick testing or testing with weak material. He was also struck by the low incidence of paralysis in immunised cases who later contracted diphtheria. Dr. BEGG agreed with him that in the immunised cases from the Eastern Hospital the course was usually more favourable than would have been expected from the initial severity.

Dr. E. C. BENN (Leeds) described 3 deaths from diphtheria in immunised children, but in 1 the post-Schick test had been positive. A more common picture was a mild sore throat with few or no clinical signs on admission to hospital. These cases should be classified as true diphtheritic infections in children with a high degree of immunity. Other speakers agreed and Dr. CRUICKSHANK pointed out that these cases, which he preferred to call diphtheritic tonsillitis, were almost invariably due either to a gravis or intermedius infection.

Dr. H. M. LEETE (Hull) thought it right to admit that diphtheria can occur in immunes, but as a modified disease. He had seen neither death nor paralysis in an immunised case. He described cases with limited membrane in which no antitoxin had been given where there had been a sharp rise in the blood-antitoxin titre within ten days. The post-Schick test might be omitted provided a reliable antigen was injected in proper doses and at an adequate interval.

Dr. A. L. K. RANKIN (Twickenham), who also favoured the early admission of suspect cases, informs the MOH on the evening of admission whether a certified diphtheria case is one of (*a*) clinical diphtheria, (*b*) no clinical evidence of diphtheria, or (*c*) under observation.

Dr. IAN TAYLOR (LCC) thought that too much had been made of the possibility of immunisation increasing the carrier-rate. A recent survey of some thousands of London school-children showed that 63% had now been immunised and yet the general carrier-rate was well under 1%. He supported the idea of a consultant service in infectious diseases and thought it unimportant whether it came from the hospital or the public-health authority. Better teaching facilities in fever for students were important.

Dr. R. A. O'BRIEN (Beckenham) thought it clear that natural cures from diphtheria in pre-antitoxin days had depended on the patient producing antitoxin himself, and this was supported by his own observation on a group of mild cases of diphtheria where the titre of antitoxin in the blood rose steeply in convalescence.

Reviews of Books

Advances in Internal Medicine

Vol. I. Editor: J. MURRAY STEELE, M D, Welfare Hospital, New York University Division. (Heinemann. Pp. 292. 21*s*.)

THIS book comprises ten reviews, each of a subject which has recently attracted interest, and each by a man who has participated in its investigation. As the title implies these reviews are concerned with advanced work, and some knowledge—not always merely elementary—of the subjects is necessary if the articles are to be read with profit. The first, on the uses of the Miller-Abbott tube in diagnosis and treatment, is a straightforward account by one of the inventors, and should encourage judicious use of this technique in practice. The article on the use of insulin and protamine insulin in the treatment of diabetes contains little fresh, but shows that transatlantic thought on diabetes is breaking free from the rigid "overproduction" theory. The article on the sympathetic nervous control of the peripheral vascular system by Wilkins is full, and is followed by two articles on the sulphonamide drugs; Macleod is lucid on their mode of action; Keafer discusses the evidence for the use of particular sulphonamides in different illnesses. It seems likely that, leaving out of account one or two illnesses which respond to individual sulphonamides, the practical problem is to agree which is the most efficient and least toxic of these drugs. A section on infections of the urinary tract summarises much useful experience, but the view that chronic pyelonephritis is an important factor in the pathogenesis of hypertension is not proven or generally accepted. Other reviews cover epidemic influenza, nephrosis, and ariboflavinosis.

Air Raid First Aid

(2nd ed.) W. A. ASHFORD. (Williams & Norgate. Pp. 46. 1*s*. 6*d*.)

IT is only nine months since this useful little summary first appeared. It compresses into small space the modifications of classic first-aid treatment which have become necessary under blitz conditions, and we are happy to observe that the three errors noted in the first edition have been corrected.

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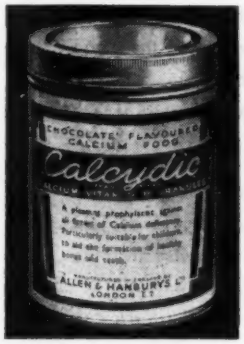

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THE LANCET

LONDON: SATURDAY, AUGUST 21, 1943

REHABILITATION AND SOCIAL SECURITY

ASSUMPTION B of the Beveridge report covers not only medical treatment in all its forms but also what he calls "postmedical" rehabilitation—an unhappy term, for some measure of medical supervision is necessary right up to the point of full fitness for work. BEVERIDGE puts forward the general propositions that rehabilitation must be continued till maximum earning capacity is restored, that a service for this purpose should be available for all disabled persons who can profit by it irrespective of the cause of disability, and that cash allowances to persons receiving rehabilitation should be the same as training benefit, including removal and lodging allowances where required. No reliable estimate has yet been made of the number of people likely to need rehabilitation, but from the Home Office statistics on workmen's compensation for 1938 (Cmd. 6203) it emerges that of every 100 compensated cases of disability arising from accident terminating during the year 3·6 had lasted for 26 weeks or more; while of every 100 cases of compensated industrial disease terminating during the year 17 had lasted for more than six months. The total number of cases in which compensation was paid under the Workmen's Compensation Act in that year was 459,223, equivalent to 5·82% of the industrial population at risk. Similar figures are not available about incapacitating sickness among the insured population generally, but in Scotland, according to a report[1] issued by the Department of Health, the average duration in days of terminated incapacities in 1936–37 among men of 30–49 was: tuberculosis, 650; diabetes, 189; anæmia, 117; cardiac debility, 108; neurasthenia or neurosis, 188; "disordered action of the heart" and tachycardia, 124. The average duration of terminated incapacity from all causes among men of this age-group was 40 days. For older men the incapacities were always longer and for women they were no shorter, except in cases of anæmia. It is obvious from these figures that there must be many patients who require rehabilitation before returning to work after long illness.

The results of rehabilitation judged by actual return to work may well be better where compensation plays no part, and there is much to be said against restricting the provision of rehabilitation facilities to compensation cases. The relation of workmen's compensation to rehabilitation is likely to assume great administrative importance. Sometimes a man who has been injured and been treated in a rehabilitation centre is restored to a level of functional efficiency which the medical officer at the centre regards as compatible with return to work, but the man feels that he should not go back until his title to compensation has been fully thrashed out. The Workmen's Compensation Act does not give a workman any right to compensation in respect of his injuries but only in respect of wages which he is unable to earn as a result of his accident, and an injured workman often thinks that some solatium is due to him and is tempted to secure as much as he can by way of compensation for loss of earning capacity. Attendance at a rehabilitation (or "fitness") centre is not compulsory, and the utmost care must be taken that no report from such a centre financed by public funds is allowed to prejudice a man's compensation status. At the same time, a man who has completed his course at a rehabilitation centre should return to work without any intervening spell of idleness which must inevitably undo the success of his treatment there. Many have found with COLLIE,[2] that "the fear of finding work too laborious, or of not finding it at all, is a factor which retards the normal recovery of many who have suffered as a result of injury or illness." This principle is insisted on in a memo[3] lately issued by the Miners Welfare Commission. Sir WILLIAM BEVERIDGE came to the conclusion that workmen's compensation—the pioneer system of social security in Britain—was based on a wrong principle and has been dominated by a wrong outlook: "in 45 years" he says, "the present system has contributed little or nothing to the most important purpose of all, which should have come first—namely, restoration of the injured employee to the greatest possible degree of production and earning as soon as possible." He recalls that in 1940 the Accident Offices Association described rehabilitation as not being their concern, though they modified this attitude later. The line now taken[4] by the association is that, while improved treatment and rehabilitation would reduce the cost of compensation for accidents, the shortening of incapacity is part of the general problem of medical services, since the proportion of accidents due to employment is probably not greater than 1 in 3.

The Delevingne Committee expressed the view that, so long as a patient requires to be under treatment by the fracture surgeon, he should continue to receive compensation as for total disability unless he is fit for light work of a remedial character approved by the fracture surgeon and is receiving wages. This light work has long been one of the major difficulties in the administration of the Workmen's Compensation Act. The accident offices point out that the incidence of accidents and the amount of coöperation in dealing with them depend on the nature of the work, the plant used, the extent and efficiency of safeguards, management and training, and on the willingness to re-employ and the possibility of re-employing injured men: there are not many light jobs in a coal mine, and usually more candidates than jobs. COLLIE thought that if after an accident a man was found to be fit for light work it was well that he should be so informed and light work found for him, but he recognised that "light work is not always satisfactory from a psychological point of view. . . . To report a man as fit for light work only is not the truest kindness." He believed that incapacity is often extended by "hysterio-neurasthenia," and that functional disease has multiplied time and time again since the inception of the Workmen's Compensation Act. The Holman Gregory Committee of 1919 was satisfied that "the average workman is anxious to return to his work as soon as

1. Seventh Report on Incapacitating Sickness, 1939.

2. Collie, J. Workmen's Compensation in the Medical Aspect, London, 1933.
3. Rehabilitation Treatment for Injured Coal Miners, July 1943.
4. Workmen's Compensation, London: Accident Offices Association, 1942.

he is able and is not disposed to malinger." Lump-sum settlements have been another source of difficulty. It has been argued on the one hand that many men who have sustained an injury anticipate a lump-sum settlement and until that is received incapacity may extend for months or even years, during which time idleness makes them more and more unfit for work; and on the other that in lump-sum settlements the object activating employers is not merely to end their liability but to reduce their commitments, and that the circumstances of lump-sum bargaining are heavily weighted against the workman.

The story is told of a man in Fife who owned a horse and cart which he sold to any miner who had recently received a lump sum and who thereupon set up as a general dealer. When the business failed, as always happened, the cart and a very thin horse were sold back to the original owner for a small sum. When the horse had been rehabilitated the outfit was resold to the next miner who received a lump sum and so the pernicious system continued, benefiting only the original owner of the horse and cart.

The circumstances of every proposed lump-sum settlement should be carefully reviewed by an impartial observer, preferably after unbiased medical advice on the nature and extent of residual disability and in the light of future employment. The Minister of Pensions has announced that a war pension will not be commutable into a lump sum.

Rehabilitation is the rounding off of good hospital treatment, says the Miners Welfare Commission's memo; used as a salvaging process for inferior hospital treatment it will prove disappointing. The primary consideration must be to ensure early and intensive treatment of all patients, whether they are incapacitated from accident or from disease, whether involving compensation or not, and to provide the resources of a national rehabilitation service where that is necessary to carry restoration to the point of fitness to return to work. Rehabilitation is, alike to the injured person and to society, of even greater importance than immediate cash payment, always assuming that the latter is sufficient to maintain a reasonable standard of living and to allay pressing financial anxiety. One of the changes proposed by BEVERIDGE is suspension of the present scheme of workmen's compensation and inclusion of provision for industrial accident or disease within the unified social service scheme, subject to special provision for finance and benefits. He proposes that all forms of short-term disability (up to 13 weeks) should be dealt with by a cash benefit—that is, by payment at the same flat-rate irrespective of earnings—but that after 13 weeks compensation should take account of earnings that have been lost, with industrial pensions for prolonged incapacity due to accident or disease arising out of and in the course of employment. For long there has been a measure of opinion that the whole system under which workmen's compensation is administered is defective, and that it should be replaced by the appointment of a commissioner with wide powers. BEVERIDGE does not speak specifically of mechanism of administration, but he contemplates that the structure should be administrative rather than legal. There have been various suggestions designed to ease the medical difficulties inherent in workmen's compensation: that the medical referee should be a public officer dealing exclusively with workmen's compensation, or as SMITH WHITTAKER urged, that the regional medical officers of the Ministry of Health should include compensation work in their duties. Existing practice which makes it possible for either side to call medical witnesses prepared to give irreconcilable evidence on oath for their respective clients on medical issues is a fruitful source of expense and has long made a lawyer's paradise. The medical board for silicosis has now operated sufficiently long to render possible an appraisal of the success of this new method of administrative approach to medical assessment of disability in relation to workmen's compensation. The report of the Tomlinson Committee has thrown into relief the importance of rehabilitation, and in the near future the Government must give thought to the many problems that will arise from it—among them the organisation of a rehabilitation service (comprehensive in scope and effectively linked with health services and with industry), the payment of allowances during rehabilitation, and the relationship of workmen's compensation to rehabilitation and subsequent return to work. These are all subjects on which there should be a considered professional opinion.

FLIES AND POLIOMYELITIS

HE is a bold man who would today dogmatise about the epidemiology of poliomyelitis. It is in the transition stage from the respiratory to the intestinal group of infections, and the evidence that the virus has its entrance and exit via the alimentary tract daily grows stronger. Epidemiologists may still believe with FROST and MAXCY that there are valid grounds for regarding poliomyelitis as a droplet or direct-contact infection, but the strongest evidence for this view came from the experimentalist who recovered the virus from the nasopharynx and then infected monkeys with it by intranasal instillation. The virus was shown to spread by the olfactory tracts to the central nervous system, and infection could be prevented by cutting the tracts or by chemical blockade of the nasal mucosa. However, these experiments were done mostly with a single strain (MV) of the virus which had become adapted to the rhesus monkey. Recent work has shown that another species, the cynomolgos or Java monkey, is more susceptible to freshly isolated virus, and this species can be infected by swabbing the pharynx with the virus, feeding the monkey with virus-soaked bananas by mouth or stomach-tube, and even by implanting the virus in an isolated loop of bowel. Chimpanzees have been similarly infected even when the olfactory nerves were cut. In the natural infection in children, virus has been recovered from the fæces of acute, convalescent and abortive cases, and from symptomless contacts; it is demonstrable much more frequently in the fæces of young than of older affected children, and, particularly in convalescence, more often in the fæces than in the nasopharynx, which is almost part of the alimentary as well as of the respiratory tract. The presence of virus in the fæces might simply mean that it was being swallowed, as tubercle bacilli are, so that the data obtained by SABIN and WARD[1] from 11 autopsied patients are particularly valuable. They failed to isolate virus from the nasal mucosa, olfactory bulbs or non-motor cerebrum, but recovered it from the pharynx, ileum

1. Sabin, A. B., Ward, R. *J. exp. Med.* 1941, 73, 771.

and abdominal sympathetic (once), and from the motor cortex, medulla, pons, and cervical and lumbar segments of the cord. Thus there is strong presumtive evidence that the virus of poliomyelitis enters the body by the alimentary tract, probably multiplies there, and reaches the central nervous system indirectly.

This altered picture of the pathogenesis of the disease naturally suggested a mode of spread in the community different from that of direct-contact infection. The summer and autumn prevalence, the apparent distribution along water-courses of several epidemics, and the greater incidence in rural or suburban areas all pointed to an ingestion rather than an inhalation type of infection. Although large epidemics have not had the characteristic features of a water- or milk-borne disease, recent recognition of the high incidence of abortive cases has shown that the infection often has an explosive character in families and small groups. The possibility of an insect as vector has long been in the mind of the epidemiologist, and the detailed report by TRASK, PAUL and MELNICK,[2] following a preliminary announcement 2 years ago, confirms earlier isolated claims that certain species of flies do in fact carry the virus. These positive findings come after a period of unsuccessful attempts, and are probably correlated with the substitution of the Java for the rhesus monkey. They have been corroborated by TOOMEY and his associates [3] and by SABIN and WARD.[4] The method adopted by TRASK was to set fly-traps out of doors near a privy or a house where one or more cases of poliomyelitis had occurred. In addition, biting insects were sometimes caught by butterfly nets, using tethered cows in the epidemic area as decoys. The separate catches, each ranging from 100 to 600 flies, were either kept in the icebox (7° C.) for 3–7 days, when the jars became covered with fly-excrement, or were sprayed with ether and the dead flies then transferred to another jar until ready for use. Either fly-washings, which included excrement, or emulsions of disintegrated flies were used to inoculate monkeys intranasally (2 c.cm. on each of three successive days) and intraperitoneally (one dose of 10–20 c.cm. of an etherised suspension). Of 37 satisfactory tests there were 4 positives and 1 probable in 21 inoculated Java monkeys, whereas there were no takes among 10 green African and 6 rhesus monkeys. Preliminary identification of the species in each catch showed that the flies commonly present in both positive and negative samples were green bottle and blow flies; there were some common house-flies in 2 of the 4 positive specimens. The biting stable-fly was not identified in any of the positive samples, nor was virus recovered from catches of biting flies in an area where non-biting flies yielded positive results.

The circumstances under which the positive results were obtained [5] are interesting. The samples were all collected in epidemic areas—a space of 15–20 acres surrounding or adjacent to the dwellings of one or more patients who had acquired poliomyelitis. The catches were made either during the epidemic period—within 10–12 days after onset of the infection—or after the epidemic was over. Of 8 samples collected within the epidemic period 4 were positive, whereas 8 samples collected after the epidemic period were all negative. In at least 3 of the 4 positive samples the insects were collected within a few yards of the potential source of human virus, in the form of freshly passed fæces from a known paralytic or abortive case. It is impossible at this stage to say if the virus actually multiplies in the body of the carrier fly. But it is established that certain species of flies carry the virus of poliomyelitis and may thereby contribute to its spread by contaminating food or drink.

2. Trask, J. D., Paul, J. R., Melnick, J. L. *Ibid*, 1943, **77**, 531.
3. Toomey, J. A., Takacs, W. S., Tischer, L. A. *Proc. Soc. exp. Biol., N.Y.* 1941, **48**, 637.
4. Sabin, A. B., Ward, R. *Science*, 1941, **94**, 590; 1942, **95**, 300.
5. Trask, J. D., Paul, J. R. *J. exp. Med.* 1943, **77**, 545.

TANNIC ACID AND LIVER NECROSIS

THE treatment of burns by the local application of solutions of tannic acid, introduced by DAVIDSON in 1925, was quickly hailed as a great advance, so that before long most burns were dealt with by immediate tanning. In time various minor modifications of the original method were adopted by different surgeons—slow and rapid tanning, and the combination or succession of solutions of tannic acid and silver nitrate. The death-rate from burns, in almost all the published figures, rapidly fell from 1925, and although part of this improvement must be attributed to concurrent advances in the treatment of shock and dehydration, much of it seemed clearly to be due to the tannic-acid treatment. When this war began, burns were quickly recognised to be a greater hazard than in all previous campaigns, and tannic acid was at first almost universally employed. Doubts soon began to arise about the tanning of burns of the face and hands, because of late contracture, but this point need not concern us here. Severe burns still too often ended fatally in spite of treatment, and active investigations into the many problems involved—shock, dehydration, toxæmia, acute duodenal ulcer and so on—were being pursued before the war, especially by WILSON and his colleagues in Scotland and later in the Middle East. In 1938 they [1] had reported severe necrotic damage to the liver in fatal burns, and BELT [2] described the hepatic changes in detail. WILSON's observations aroused suspicion of the toxicity of tannic acid, as he was able to demonstrate a similar liver lesion in animals injected with tannic acid or sodium tannate. His subsequent work is mainly contained in confidential Service reports, but last year WELLS, HUMPHREY and COLL [3] in America described severe liver necrosis in fatal human burns, and reproduced this lesion in rats by injecting tannic acid. As BARNES and ROSSITER point out on p. 218, it seems that the special type of liver damage (universal central necrosis of lobules) was not seen before tannic acid was used in treatment, and ALLEN and KOCH [4] who have not used the tanning method found no liver damage in any of their fatal cases. The observations of WELLS and his colleagues, as they became widely known, rapidly began to shake confidence in tannic acid, and many surgeons turned to other methods, new or old. Lately, for example, PENDLETON [5] has drawn attention to the advantages of a spray of paraffin wax, sulphanilamide and other ingredients, an adaptation of the 'Ambrine' popular

1. Wilson, W. C., MacGregor, A. R. and Stewart, C. P. *Brit. J. Surg.* 1938, **25**, 826.
2. Belt, T. H. *J. Path. Bact.* 1939, **48**, 493.
3. Wells, D. B., Humphrey, H. D. and Coll, J. J. *New Engl. J. Med.* 1942, **226**, 629.
4. Allen, H. S. and Koch, S. L. *Surg. Gynec. Obstet.* 1942, **74**, 914.
5. Pendleton, R. C. *J. Amer. med. Ass.* 1943, **122**, 414.

in the last war. ERB, MORGAN and FARMER[6] have published an account of 61 fatal burns, all examined carefully by the same pathologist (ERB) between 1920 and 1942. In all, 41 of the cases had been tanned, and 25 of these showed definite hepatic necrosis at autopsy, while this lesion was completely absent in 21 untanned patients. Their records seem to bear out the great reduction in the mortality of burns after tannic acid was first used in 1925—from 32·2% to 11·8%—but they add that the introduction of sulphonamides and other methods have further reduced the mortality. A fact also brought out by their figures is the transfer, after tannic-acid treatment, of the main mortality from the primary period of shock (12–36 hours) to the period of toxæmia (3–6 days), the time when the necrotic lesion in the liver is most often found.

As these facts accumulated, it became clear that the toxicity of tannic acid, its relation to the hepatic damage noted, and the question whether this method of treating burns should be abandoned all required active investigation, and much work has been done on these lines both here and in America. CAMERON, MILTON and ALLEN, whose paper appeared in these columns last week, have experimentally investigated the toxicity of tannic acid when introduced into the animal body by various routes, and the chances of its absorption through burnt surfaces. They show that gallic acid, often contained in commercial samples of tannic acid, is harmless, but prove conclusively that tannic acid is a toxic drug. Its main effects are hæmoconcentration, great œdema at the site of injection, loss of plasma proteins, renal damage and hepatic necrosis. The main part of the liver lesion is a coagulation necrosis of the centres of all the lobules. In the later stages of non-fatal experiments they note the early evidence of the remarkable power of the liver lobules for repair. Their experiments leave no doubt that tannic acid is absorbed from large burnt surfaces, and can be demonstrated in the tissues, including liver and kidneys, by suitable tests. BARNES and ROSSITER describe in this issue how to obtain burned surfaces of more or less uniform size for animal experiment. They confirm in general all the toxic effects of parenteral administration, and report slight liver damage after the application of tannic acid to a fresh burnt area, amounting to about a quarter of the body surface of a guineapig. They lay stress on two other effects of tannic-acid applications, not previously noted—a higher mortality in the tanned animals, and a striking loss of weight as compared with controls. With CLARK, ROSSITER has demonstrated impaired liver function in rabbits injected with tannic acid, the results being more variable after intravenous than after subcutaneous injection, presumably because the toxic effect is more sustained with the latter route. These workers are rightly cautious in interpreting their experimental results. CAMERON and his colleagues claim only to have proved the toxicity of tannic acid in animals, and that the drug can be absorbed through raw burned surfaces; the Oxford workers confirm this.

In the end the tannic-acid treatment of burns must stand or fall on the clinical evidence, and the records of ERB, MORGAN and FARMER of Toronto already show that great caution is required in tanning large burnt surfaces. There is clearly a great difference between the effects of tannic-acid injection and its application to a burn, and even if slight hepatic damage, rapidly capable of repair, occasionally ensued from tanning a small or moderate sized area, this would not condemn the method provided it had advantages over all the others available. It has lately been claimed, however, that disadvantages, such as slowness of healing under the dense and firm tan, outweigh the advantages of the method. It seems possible that newer procedures, now under trial, will entirely supersede tannic acid, or that tannic acid will remain the application of choice for smaller burns of the body requiring immediate treatment in difficult circumstances such as on the battlefield or at sea.

6. Erb, I. H., Morgan, E. M. and Farmer, A. W. *Ann. Surg.* February, 1943, p. 234.

HOT DINNERS FOR SCHOOL-CHILDREN

REASONS for communal feeding in war-time are obvious—economy of labour, time and fuel alone would justify the setting up of canteens and a large extension of the system of school meals. But if communal feeding of school-children is to be widespread it must first become popular. Mr. F. LE GROS CLARK, whose intimate knowledge of the subject is reflected in reports summarised on p. 235, has shown how, little by little, the indifference or opposition of parents and authorities has been or is being overcome. Up to 1939 few of the large boroughs were providing meals for payment, though a considerable number of free meals were being supplied to necessitous children. In many cases these meals were eaten in "feeding centres," separate from the schools, and a flavour of poor law and charity seemed to many of the more self-respecting parents to be associated with them. From the summer of 1940 the Board of Education made a special effort by circulars and visits of peripatetic inspectors to exorcise this bogy: the board's steadfast belief that meals should be associated with education was emphasised by insistence that children should dine in their schools, where possible under the supervision of their teachers. After some early hesitancy the public demand for school meals began to grow. Success bred success, and an attractive circular letter to parents often brought demands far in excess of the available accommodation.

The Ministry of Food and the Board of Education are agreed about the value of school meals, and the board's circular addressed to local education authorities in May urges a great speed-up in the arrangements. A rise in two years from 300,000 to a million and a quarter children having dinner at school is a striking one, but the circular says: "It will not be possible to hold that school-children have been made as secure as is reasonably possible in the circumstances against nutritional dangers arising from the war until the majority of them are able to have a hot midday meal at school, planned to meet fully their needs for health, growth and energy." The board aims at providing meals for three-quarters of the nation's elementary and secondary school pupils. The Government's offer to adapt existing schools, and, where necessary to supply, erect and equip kitchens, sculleries and canteens free of charge bodes well for the future. Evidently the board has more than the present war period in view, and there is reason to hope that hot dinners will persist as a regular feature of school life. The white-paper on education (Cmd. 6458) again emphasises the importance of proper feeding of children, and foreshadows the conversion of the powers of education authorities to provide school meals

into a duty. Speaking in Yorkshire recently, Mr. R. A. BUTLER said that to a large proportion of our children a hot dinner every day was in itself a revolution, and added "the dinner we are trying to provide is not just a dinner, but a very good dinner indeed."

Who is to be responsible for seeing that the standard of food is kept at the level recommended by the board—a meal supplying about half the child's daily requirements of protein and fat and a reasonable proportion of vitamins? In past years the board's chief medical officer has suggested that school medical officers and their assistants should undertake "effective supervision" of school meals. According to LE GROS CLARK[1] medical officers vary extremely in the time and attention they give to this, and with the immense expansion of canteens envisaged it seems unlikely that they will have time for the increased work involved; this duty may be undertaken entirely by the Board of Education inspectors of school meals, whose numbers have lately been increased, but their time is occupied with general instruction and advice. It seems hardly fair to expect teachers to give up their lunch-hour to supervising the children's dinner. No great difficulty appears to have arisen in securing suitable staffs to run the canteens. The planning and cooking of well-balanced and varied meals every day in the week calls for considerable skill and knowledge of food values. Here is a promising field for those trained in dietetics and having a real interest in the nutritional welfare of our children.

Annotations

TUBERCULOSIS NURSING

THE General Nursing Council and the Royal College of Nursing have rejected the suggestion of the Rushcliffe Committee that tuberculosis nursing should be given a separate section on the Register of Nurses. The need to consider the nursing service as a whole grows daily more acute; it will not be met if one branch after another adopts the rôle of isolationist. What reason is there for demanding separate registration for tuberculosis nursing and not regarding it as an integral part of general nursing? Nursing techniques, whether medical or surgical, are based on the same principles whatever the nature of the illness or the grouping of the patients. There was a time when tuberculosis was just a discard from the general hospital, of little interest either for doctors or nurses. The memory of that time still lingers although the treatment of tubercle, whether at hospital, sanatorium, colony or dispensary, has become as varied and interesting as any branch of medicine. Moreover, the prospect for the patient has changed radically now that public opinion has decided that the blight of economic anxiety is to be lifted from him. This moment, when tuberculosis, so long exiled, is being received back into the home of general medicine, is not the time to create a new and segregated order among those who nurse it. Competition for entrants to nursing has affected adversely both sanatoriums and mental hospitals, whose staffing probably have indeed much in common. Sanatoriums (and mental hospitals too) really need a large proportion of fully trained staff; sisters, charge nurses and staff should all be required to hold the SRN certificate. Effective ways must be found to attract them, and of these the first might well be liberty and means to live outside the institution. There would also have to be a large permanent staff of trained assistant nurses as soon as they become enrolled and available. Besides these, a changing population of student nurses—girls taking general training in the hospitals of the region—would be sent for 3–6 months of experience of tuberculosis nursing as a part of their course. This would serve a double purpose, for whatever direction her work may take in the future every nurse should be well trained in the care of tuberculous patients if only because she needs to protect herself and her other patients when a chance case of tuberculosis is admitted to a general ward. There is reason to think that the incidence of tuberculosis is higher—probably considerably higher—among nurses in general hospitals than among those working in sanatoriums; which may well be due in part to faulty management of the occasional case of open tuberculosis. Those who are later to undertake district or public-health nursing must fully understand the management of tuberculosis in the home and the risks to contacts if they are to become the exponents of prevention and positive health. It has been said that the care of the tuberculous does not readily appeal to young girls, and that their distaste springs partly from ignorance and partly from fear of infection. Both of these bogies would be laid by a sound regional plan in which tuberculosis would take its proper place in general training. Segregation will never achieve it.

1. Principles of Canteen Inspection. War-time Nutrition Bulletin, No. 25, March, 1943.

THE REFUSAL TO REMEMBER

HYSTERICAL symptoms tend to follow the fashion. Medieval witches had intercourse with the devil, while village maidens conversed with saints. Victorian ladies developed astasia abasia or that glove-and-stocking anæsthesia now seldom worn. Psychogenic symptoms are usually either imitations of actions seen or read about, or are reversions to the behaviour patterns of childhood. As "loss of memory" is accepted by the community as illness rather than carelessness, amnesia is to be found in soldiers who have overstayed their leave.

The origin of psychogenic amnesia is emotional distress. The patient is unable to face his situation and walks out on it. During this period he is probably aware of his actions, and his behaviour appears normal to others, provided he is not interrogated. After wandering for eight hours or so, the need for food or shelter forces him to realise that his behaviour has not only not solved his original worry but has created the additional problem of explaining his recent conduct. It is probable that the amnesia develops only when he decides to give himself up or when he is confronted with authority—a mild panic reaction. Like the guilty child who denies his misdeeds, the patient denies himself. Children often run away from difficult situations, but are unaware of the need to develop amnesia, which is an adult rationalisation. If the precipitating factor in such cases seems inadequate, allowance must be made for the simpler ideation and emotional level of children and hysterics.

No sharp division can be made between hysterical amnesia and malingering. The distinction depends more on the psychology of the physician than on the behaviour of the patient. At one extreme is the conception that all malingering is due to constitutional inadequacy and must be excused under the heading of psychopathy; while others consider that amnesia is little removed from conscious motivation. The "shell shock" controversy of the last war is being renewed with different terminology. D. N. Parfitt and C. M. Carlyle-Gall, at the annual meeting of the Royal Medico-Psychological Association on July 29, gave a paper, based on 40 RAF ground-staff cases, which suggested that in these patients the amnesia was never far from conscious levels and was cured by simple persuasion. Doubtless many such cases are met with in the Services, where emotional stress is naturally greater than in peacetime. But because a hysterical symptom can be removed by persuasion and because we understand its motivation, are we to conclude that the patient is

virtually a malingerer? And does this apply equally to other hysterical symptoms such as paralyses and anæsthesias? Hysterics are suggestible and this determines the onset of their symptoms as well as their cure. The "normal" person cannot become anæsthetic or amnesic simply by wanting to: his personality prevents it. If the hysterical patient can develop psychogenic paralysis of memory or any other function, is not this the proof that he should not be judged by normal standards of behaviour?

VACUUM-DRIED HUMAN SERA IN INFECTIOUS DISEASES

DRIED serum and plasma are being widely used for transfusions, but not much has been heard of their employment in infectious disease, though for eight years McGuinness, Stokes and Armstrong [1] have used vacuum-dried human sera for specific prevention and treatment of measles, scarlet fever, whooping-cough, mumps and chicken-pox. For this purpose dried human serum has many advantages. The serum keeps well, and when prepared by the newer technique gives as good results as the fresh material. A supply can be kept at full potency against epidemic time. It can be given intravenously and by other routes without causing reactions, and it is as safe as ordinary serum. It can be administered in much larger doses with less bulk—thus, the dried product from 20 c.cm. of serum can be re-dissolved in 8 c.cm. of water—and this is particularly useful where intramuscular injection is adopted, as in measles prophylaxis. Hyperimmune serum can be used in the treatment and prophylaxis of whooping-cough. Convalescent serum has been extensively used in measles prophylaxis, but, since true convalescent serum is scarce owing to the early age at which the disease is contracted, serum from healthy young adults has been given instead. The disadvantages of adult serum are its low potency, necessitating large doses (10 c.cm. under three years; 15 c.cm. under four years; 20 c.cm. under five years), and that it rarely ensures prevention and secures attenuation in only a proportion of cases. When the serum is really required, as at the beginning of an epidemic, dried serum, with its maintained potency and diminished bulk, is likely to be much more efficient than the ordinary serum kept in reserve. McGuinness and his colleagues have obtained good results in the prophylaxis of measles. In the prophylaxis of scarlet fever the case-incidence was only 2·6%, using serum from Dick-negative subjects, while a good response to treatment was obtained in 76% of scarlet-fever cases given 30–120 c.cm. of serum intravenously. With whooping-cough they have used dried hyperimmune serum, prepared from adults who had the disease in childhood and have received repeated injections of pertussis vaccine. The agglutination titre of such sera varies from 1 in 1280 to 1 in 5120, whereas that of the ordinary convalescent is in the region of 1 in 300. When used prophylactically in 106 young children with intimate contact, prevention was secured in 67%, while typical pertussis developed in 10·5%. Over a wider range of ages, 78% were protected and only 6·1% took the typical disease, the remainder showing varying degrees of attenuation. Good results were obtained when the hyperimmune serum was used for treatment of pertussis; out of 315 cases only 5 (1·5%) died.

In mumps and chicken-pox convalescent serum has yet to prove its value. During the war the giving of blood by volunteers has become a commonplace. As drying plants get going, volunteers will probably be asked to produce hyperimmune serum. The horse has to do it in the preparation of diphtheria and tetanus antitoxin; why should not humans do it for those peculiarly human diseases in which no animal can help?

1. McGuinness, A. C., Stokes, J. and Armstrong, J. G. *Amer. J. med. Sci.* June, 1943, p. 826.

A GENTLEMEN'S AGREEMENT

Lord Amulree's researches in the Royal Library at Windsor reveal the brighter side of eighteenth-century warfare. The convention he describes on p. 234 anticipated by more than a century the first international red-cross convention for the protection of prisoners and the sick and wounded, which was signed at Geneva in 1864. Nor was it the first. For many years a slowly growing humanity had been replacing the barbarism that so often led to massacre and neglect. At the siege of Tournai in 1581 the opposing forces agreed on a policy of mercy; and previously, at the siege of Metz in 1552, a high standard had been set by the French. Inside this city the medical arrangements were in charge of Ambroise Paré, and when the Emperor Charles V raised the siege his sick and wounded were faithfully tended, and safe conduct and transport were offered to messengers who came to take disabled prisoners back to their own lines. To us today, accustomed to the doctrine of total war, the generous terms of the Frankfurt commanders make strange reading. We are astonished at their latitude, although someone may recall that Sterne's "Yorick" made his *Sentimental Journey through France* at a time when that country was at war with his own. It would be difficult to go to Germany today in like forgetfulness. Lord Amulree points out that in those days civilians were considered neutral, and that the medical personnel attending the sick and wounded were regarded as civilians. This conception of the neutrality of medicine is embodied and preserved in the Red Cross, but in a world where civilians more and more approximate to combatants its development and growth leave much to be desired. It is hardly surprising that the medical officer on either side should usually feel himself to be part of the war effort of his country: the Americans, indeed, frankly term their medical personnel "medical soldiers." Nevertheless the medicine that recognises no frontiers between human beings represents an ideal that must eventually prevail; those who believe in it will have unparalleled opportunities in the world after the war. And though the gentleman as a person of rank may be out-moded, we have to see that the courtesies of the eighteenth century become common form in the Century of the Common Man.

INHIBITION OF SULPHONAMIDES BY LOCAL ANÆSTHETICS

COMPOUND fractures and other wounds are now extensively treated by the local application of sulphonamides, and some are now operated on under local anæsthesia, the most common preparation used being procaine. Each of these procedures is excellent in itself, but (as has previously been pointed out in these columns) there are objections to combining them in the treatment of one and the same case. As Woods originally showed, the bacteriostatic action of sulphonamide compounds is completely neutralised by small amounts of *p*-aminobenzoic acid, and by other substances which contain this group. Procaine is diethylamino-ethyl-*p*-aminobenzoate and can neutralise sulphanilamide in the same way as the parent substance does. This has been shown by bacteriostatic tests in vitro and in the treatment of mouse infections by Spink and Jermsta [1] and by Keltch and others,[2] and has recently been verified by Casten, Fried and Hallman [3] in experimental wounds of rabbits. The wounds were infected with *Staphylococcus aureus*, and in the absence of treatment abscesses developed in every animal. If sulphathiazole was

1. Spink, W. W. and Jermsta, J. *Proc. Soc. exp. Biol. N.Y.* 1941, **47**, 395.
2. Keltch, A. K., Baker, L. A., Krahl, M. E. and Clowes, G. H. A. *Ibid*, 1941, **47**, 533.
3. Casten, D., Fried, J. J. and Hallman, F. A. *Surg. Gynec. Obstet.* 1943, **76**, 726.

inserted at the same time as the infecting organism, 60% of the wounds remained free from infection, and in the other animals the infection was much lighter than in the controls. If, however, the walls of the wound were infiltrated with procaine, the therapeutic action of the sulphathiazole was abolished and all wounds became infected. It is possible that procaine in human wounds would not inhibit the sulphonamide quite so decisively, since de Waal, Kanaar and McNaughton [4] did not observe any ill effects in three patients; but these cases are too few to carry much weight and it is better to be on the safe side and avoid this sequence whenever possible. Avoidance is the easier because the neutralisation of sulphonamides is effected not by *all* local anæsthetics but only by those which contain the *p*-aminobenzoate group, which is not an essential for the production of analgesia. Thus de Waal and his colleagues point out that procaine, 'Larocaine,' 'Tutocaine,' 'Butyn,' 'Anæsthesin' and 'Orthoform' contain this group and neutralise sulphonamides, whereas cocaine, tropacocaine, eucaine, 'Stovaine,' 'Nupercaine,' 'Phenocaine,' 'Pantocaine,' 'Psicaine,' 'Eccaine,' 'Elypin,' 'Apothesine,' 'Diothane' and 'Metycaine' have a different chemical constitution and are harmless in this respect. In wounds which are subsequently to receive sulphonamides, the use of one of these latter substances seems to offer a simple and rational solution of the difficulty.

HEAD WOUNDS IN THE MIDDLE EAST

IN his paper on our opening pages Ascroft reports that of 516 patients with head wounds of varying severity due to missiles incurred in the Middle East campaign, only 9% died. This is a sound tribute to the surgical treatment, but even more impressive is the fact that of those who survived no less than 310 (71%) returned to duty. This group included 124 cases of major injury with penetration of the dura. Doubtless the splendid physical condition and high morale of these men of the Eighth Army before their injury contributed to the results, but the methods of surgical treatment and the common-sense psychotherapy applied during convalescence were just as important. The technical details should be studied by every surgeon who may be called on to deal with head wounds in the forward areas, where segregation of cases for specialists has proved impracticable. The experience in this series confirms that of Cushing in the last war in showing that an early but inadequate operation in the forward area is usually more dangerous than one delayed until it can be done in more convenient surroundings with special equipment, such as X rays, electrocoagulation apparatus, a mechanical sucker and so on. Cases of impending death from intracranial hæmorrhage will have to be dealt with wherever they occur, but with most other cases the problem is one of transport, and here aircraft have been an immense help. Ascroft says that, if there is a reasonable prospect of transport to a base hospital within 48–72 hours of the injury, it is better to limit surgery in the forward area to cutting the hair round the wound, dusting the wound liberally with sulphanilamide powder, and fixing the first field dressing securely in position. He pleads for adequate entries on the Field Medical Card and the Head Injury Card, because these records may supply invaluable information in assessing subsequent developments. If there is likely to be a longer delay in getting the patient back to the base hospital, he advises an "open toilet" procedure, which entails excision of devitalised scalp, removal of dirt, debris and loose fragments of bone and metal which are visible, easily accessible and can be removed without provoking hæmorrhage, and leaving the wound open. In his section on deliberate treatment at the base Ascroft describes the procedure from the arrival of the convoy. The immediate examination aims chiefly at assessing, first, the state of shock, to enable the necessary treatment to be instituted at once; and secondly, the state of consciousness, which was found the most useful index for establishing priority of treatment among a number of serious cases. The next step—even before the patient is sent to the ward—is a careful X-ray examination, indispensable in these cases. As a rule devitalised scalp was excised more widely than is necessary in civilian accidents because in these deep missile wounds layers are often more extensively destroyed than the superficial ones. The loose fragments of depressed and penetrating fractures were removed piecemeal rather than en bloc (as in an osteoplastic flap). If the dura had not been penetrated, it was not opened at operation unless there was evidence of cerebral compression, as by a clot. If the dura had been penetrated, it was rarely necessary to enlarge the opening, but loose tags of dura were excised, and if the bone fragments was gently sucked out, thus removing damaged brain, clot and some of the foreign bodies. No attempt was made to remove deep-seated metallic fragments, but loose fragments of bone driven into the brain were removed because they were found to be potent factors in the development of brain abscess, in contrast to the metal fragments which had presumably been sterilised by their own heat. The dura was never closed for fear of incarcerating infected material in the brain. Clean wounds of the scalp were closed with a layer of stitches in the galea and one layer in the skin, a corrugated rubber drain being led out through a stab wound. Frankly septic wounds were left open. Ascroft recommends morphine for allaying the alarm and restlessness of battle casualties, and no untoward effects were noticed; there is a well-founded prejudice against the use of morphine for civilian head injuries. For violent restlessness during transport or in the postoperative period intravenous paraldehyde proved safe and effective. At operation, intravenous anæsthesia ('Pentothal') was soon found to be the method of choice rather than local infiltration or inhalation anæsthesia. The patients were encouraged to get up and about and help in the ward work and recreations as soon as they felt like it. This is occupational therapy at its best, and there can be no doubt that the attitude of doctors, nurses and fellow-patients did much to lessen the impression of the gravity of a "brain wound" for these men. These principles could usefully find a wider application in civil and industrial accidents at home. Another point which emerges clearly from this study is the rôle of the specialist in battle surgery. With head wounds the War Office has struck a balance between rigid specialisation and segregation on the one hand and blunderbuss general surgery on the other; and with no type of injury has the success of their policy been more firmly established.

4. de Waal, H. L., Kanaar, A. C. and McNaughton, J. *Lancet*, 1942, ii, 724.

THE annual general meeting of the British Medical Association will be held on Wednesday, Sept. 22, at 12.30 PM at BMA House, Tavistock Square, London, W.C.1. The meeting of the Representative Body begins on the previous day.

"The shortage of practising midwives to which special reference was made in last year's report still exists and causes anxiety," writes Sir Comyns Berkeley in this year's report on the work of the CMB. Nearly a thousand more pupil-midwives began training during this year than last and the Roll of Midwives contained 1480 more names (total 67,112) on 31.iii.43 than on 31.iii.42. But the situation will only be eased if more pupils continue in practice and that in turn depends on what the word "Rushcliffe" means to them. The CMB is not party to any restriction on the midwife's right to use drugs and is compiling a register of those qualified to administer gas-and-air analgesia. The report offers thanks to the midwives who are maintaining the high tradition of their profession, at present in the face of difficulties and dangers.

Special Articles

SIR JOHN PRINGLE AND THE FRANKFURT CONVENTION

A BICENTENARY

LORD AMULREE, M D, M R C P

IN 1742, on the outbreak of the war of the Austrian Succession, 16,000 English troops landed in the Low Countries, under the command of the Earl of Stair, to fight on behalf of the Empress Maria Teresa against the French. Lord Stair established his headquarters at Ghent, and a hospital was opened in the town staffed by a director, a surgeon, a physician, an apothecary, six mates and a matron. The physician was Sir John Pringle, the surgeon-general of the English army and personal physician to the commander-in-chief; for his work Pringle was paid 20*s*. a day with the prospect of retiring on half-pay for life.

After a year's desultory campaigning, the French and allied armies (the English had been joined by contingents of Hanoverian and Austrian troops) met near the River Main on June 27, 1743, and the battle of Dettingen was fought. The allies won the battle but retired quickly to their base at Hanau on the Main, leaving the French in possession of the field and of 600 out of their 1300 wounded.

Shortly before the battle, however, the two commanders, on the initiative of Lord Stair, had come to an agreement for the proper care of their prisoners and wounded, and from the way in which Pringle refers to this agreement in the introduction to his *Observations on the Diseases of the Army*, it seems likely that he was concerned in making it:

"Till then it had been unusual for the security of the sick (when the enemy was near) to remove them a great way from the camp, where many were actually lost before they came under the care of the physician, but the Earl of Stair, my illustrious patron, being sensible of this evil, when the Army was encamped at Aschaffenbourg, proposed to the Duc de Noailles (of whose humanity he was well assured) that the hospitals on both sides should be considered as sanctuaries for the sick and mutually protected. This was readily agreed to by the French General who took the first opportunity to show a proper regard to his engagement. For when, after the battle of Dettingen, a hospital was at Feckenheim, a village on the main at a distance from the camp, the Duc de Noailles, having occasion to send a Detachment to another village upon the opposite bank and apprehending that this might alarm the sick, he sent to acquaint them that, as he knew the British hospital was there, he had given express orders to his troops not to disturb them. This agreement was strictly observed on both sides during the campaign though it has been since neglected, yet it is still hoped that on future occasions the contending parties will make it a precedent."

This statement is confirmed by a letter which the Duc de Noailles, the French commander, wrote to Lord Stair on June 30, three days after the battle.

"Sir,—I have sent M. de Silhouette, Commissioner of War attached personally to myself, to you to treat provisionally with whom you may please to nominate concerning the exchange and ransom of prisoners of war and the care and safety of sick and wounded. I have already ordered that care shall be given to the sick left at Aschaffenbourg and that, according to the Convention which you have proposed to me, they shall not be retained as prisoners of war. I have gathered here almost 400 wounded who have been kept apart and who are being cared for as our own. As soon as the first arrangements have been made between the two sides we will be able to sign a treaty on the usual lines so that one will know on what one may rely, and, in the event of fighting, one can act as brave and honest men who serve out of loyalty to their Prince and their country without that hatred and cruelty which must be left to the barbarians."

Shortly after, on July 18, 1743, a convention was signed at Frankfurt by representatives of the English, French and Austrian commanders dealing with the position of prisoners-of-war and wounded. A copy of this convention is in the Royal Library at Windsor and I must acknowledge my thanks for permission to quote from it. The convention is interesting for the humanitarian principles for the treatment of prisoners and wounded which it lays down, and it crystallises into words the agreement to which both Pringle and de Noailles refer.

It provides that all prisoners, with no exception, shall promptly be exchanged or ransomed, and—that there shall be no difficulty about the exchange or ransom—the corresponding ranks of the opposing armies are set out with their monetary value placed against each. A simple formula for calculating the rate of exchange is also given. It is agreed that a nominal roll of prisoners shall be kept and that each army shall promptly inform the other of what it owes for the maintenance of prisoners, the note of this indebtedness to be conveyed by one of the returning prisoners to his own commanding officer. The prisoners shall receive the same ration of bread as the serving troops, and an account of the cost of this is to be kept so that at the exchange any excess of cost of one side over the other can be paid at a fixed rate. Prisoners shall be given clean straw which shall be changed weekly. All prisoners may give information of their capture, and no prisoner shall be forced to enlist in the enemy forces; quartermasters shall be allowed to forage for food provided they do not approach nearer than two leagues to any fortified place or to the respective armies.

Then follow two articles which are of particular interest as they deal with the care of the wounded and sick.

Article 41.—"That care will be taken of the wounded of both sides; that their medicine and food will be paid for; that the cost will be repaid by both sides; that it will be permitted to send to them surgeons and their servants under passports from the Generals commanding; that those who have been taken prisoner as well as those who have not shall be sent back under the protection and safe-conduct of the Generals, either by land or by water as is most convenient and suitable from the places where they are on condition that all those who have been made prisoners shall not serve until they have been exchanged."

Article 42.—"That the sick and wounded on either side shall not be made prisoners; that they shall remain in safety in the hospitals where each of the belligerent and auxiliary parties may leave a guard which, together with the sick, shall be sent home under the passport of the General commanding by the shortest route and without being harrassed or arrested. Likewise all commissaries or muster-masters, chaplains, physicians, surgeons, apothecaries, waiters, nurses, servants or other persons appropriate to the care of the sick shall not be made prisoners and shall be sent back in the same manner."

As the convention was designed to improve the lot of sick and wounded as well as of prisoners, it is natural that some protection should be afforded to those upon whose care their welfare depends—i.e., doctors and other medical staff. But a subsequent article gives a further list of those persons who, if captured, shall not be treated as prisoners of war—namely, "the Provost-Marshal, Lieutenants and other Officers of the Military Police, the auditor, clerks and other lay officials in the army, chaplains, ministers, postmasters, their clerks, couriers, postillions, physicians, surgeons, apothecaries, directors and other hospital officers, grooms, major-domos, valets de chambre and other servants."

This article follows immediately upon those dealing with the amount of ransom which can be obtained for men of various ranks in both armies.

In those days warfare was a matter to be decided between two armies of professional soldiers; although the civil population might, and indeed often did, suffer in the course of military operations, war itself was not directed at them. It may well be that the privilege which these protected persons appear to have received was in itself a recognition of their essentially civilian status and was not intended to serve as any recognition of their professional position. This indeed is comparable with the situation under the present Red Cross convention by which medical staff and others are protected because of their importance to the wounded, and not from any inherent privilege which their professional status may possess.

The Hospital Saturday Fund has decided to extend its benefits by granting hospital vouchers for cases in maternity hospitals or in the maternity wards of voluntary hospitals. Domiciliary or nursing-home treatment for these cases is not included in the new scheme.

SCHOOL CANTEENS

THE communal feeding of elementary-school children has been officially sanctioned since 1906. The Acts of that year and of 1921 were concerned more especially with necessitous children, though even before the last war the principle had been extended to include provision for children who, for various reasons, might be likely to benefit from a school meal. As time went on the regulations empowered an education authority to supply meals for payment to any child whose parents wished it. School meals were, however, little taken advantage of; in the years between the wars there were few days on which more than 3% of the children were receiving a midday meal at school. At least two-thirds of these were necessitous cases being supplied with free meals, and more than a third were concentrated in twenty-four large industrial centres.

FEEDING THE EVACUEE

Mr. F. Le Gros Clark has made a special study of communal feeding, and from time to time, in association with officers of the Board of Education, has issued well-informed reports [1] tracing developments since the war began. Evacuation of children at once raised the problem in an acute form. In July, 1938, the Anderson report of the Home Department Committee on Evacuation had taken the view that private householders could not be compelled to provide such services as cooking for "refugees" received into their homes, and had maintained that large-scale plans for communal feeding would have to be included in the scheme. Shortly afterwards the Ministry of Health assumed responsibility for evacuation in place of the Home Department, and the principle was expanded further. Definite proposals were put forward that midday meals should be provided in order to relieve householders, it being assumed that the advantage of being rid of the children at midday would be sufficient to induce the householder to pay for the meals out of the billeting allowance. When the time came to put it into practice, this proposal did not meet with the expected response, and, as a whole, the early efforts at communal feeding of evacuees were not strikingly successful. The finding of premises in which to run canteens was one difficulty; unwillingness on the part of a good many householders to give up 15–20% of the billeting allowance for the provision of one meal a day was another. The position varied considerably in different parts of the country. The Home Counties received the largest percentage of evacuated children, and also made the greatest effort towards feeding them communally, probably owing to the comparatively high proportion of voluntary organisations available. Such diverse districts as Bedford, Carlisle, Darwen and Windsor reported after careful investigation that communal feeding was unnecessary.

The demand for free meals early declined in the larger towns, partly because many children had been evacuated, and partly because of improvement in the financial circumstances of the family. Dr. St. Clair Stockwell, school medical officer for Leeds, drew attention in his report of 1940 to the relative failure of free feeding schemes as compared with a canteen where no distinction was made, and where the atmosphere of cleanliness and the presence of teachers at the meals had helped in improving the tone of the service.

EXTENSION TO ALL CHILDREN

The first real stimulus came with the issue by the Board of Education in July, 1940, of Circular 1520. By its provisions school feeding became a recognised part of war economy, and the distinction between native children and evacuees was swept away. Education authorities were asked to consider the desirability of feeding not only "children whose needs are not fully met by the normal provision of food at their homes," but the ordinary child population, and to encourage parents to take advantage of the facilities offered. At the same time a substantial increase of grant was promised, including an understanding that no authority was to receive less than a 50% grant. All children were henceforth to be fed at school if the parents or fosterparents desired it, and all meal centres were to be known as "school canteens," thus removing the stigma of relief connected in the minds of many parents with the "feeding centre."

From this time the canteen service developed slowly but steadily to the end of 1940. Progress was fairly even from month to month, but very uneven in different parts of the country, and as late as the spring of 1942 forty-five authorities had taken no steps to put a feeding scheme into operation, a large majority of these being towns of no great size scattered mainly over the southern half of England and South Wales.

Naturally the arrangements for school feeding were affected by the movement of children from certain areas, especially the sea-coast towns, as well as by the bombing of industrial centres and the absorption of women into war work. In London the provision of school meals was suspended in the first months of the war, and only slight progress in restoring them had been made by September, 1940, when the serious bombing ordeal began. Fresh emigration of children into the country left London with a school population of about 100,000 in the early part of 1941—rather less than a quarter of its prewar numbers. In February of that year, some 2400 were being provided with meals. By the end of the year meal centres were being used not only as dining places but also as kitchens from which food could be despatched to other schools, and by the late spring of 1942 London was able to provide for more than 20% of its average school attendance.

CANTEENS AS AIDS TO NUTRITION

Both the Board of Education and the Ministry of Food had decided that school meals were a proper part of any rational war economy, and, as Le Gros Clark puts it, "Relations between the two departments have had the result of deepening this conviction into a dogma." The effect of this coöperation was seen in the terms of Circular 1567, issued in October, 1941. The rate of grant on the provision of milk was then raised to 100%, and the minimum grant on meals was raised from 50 to 70%, with a general rise of 10% on the grants then in force. To impress on authorities the importance of the feeding problem school canteens were brought within the priority arrangements for distributing certain unrationed foods. From this time school canteens entered on a new phase of development. The Board of Education was aiming not merely at relieving women engaged on war-work but also at ensuring to school-children a measure of differential rationing. Nor has it stopped there. In Circular 1629, addressed to local education authorities in May of this year, the President of the Board asks for an accelerated programme in the school meals service. He gives credit for progress already made, but says that the Government's objective will not be reached until 75% of the children are being catered for. To speed up the attainment of this end, the Ministry of Works is to provide kitchens, sculleries and canteens free of charge to local education authorities where necessary, and to adapt existing school premises where practicable. The offer applies equally to large urban areas and small country districts. The kitchens will usually be housed in standard huts, and the equipment, both light and heavy, will be provided according to local need. New premises for dining are much more costly than kitchens, and new dining accommodation will not therefore be provided during the war where tolerable arrangements can be made for the children to dine in an existing hall or classroom. When increased numbers make extra accommodation essential, prefabricated huts will be approved for dining purposes.

The object of the school meals service is to secure and maintain a high standard of nutrition among school-children. In this latest circular the Board of Education says: "To serve their purpose, school dinners must be good and ample; good in the sense of including the full allowances of protein foods and fats, plenty of green vegetables, &c., which are relatively costly, and adequate in quantity." Experience has shown that regular demand depends on the quality of the meals, and there is a general desire among authorities to reach the standard recommended by the Board. Evidently school dinners have come to stay, and they will play an important rôle in building up a sound physique in our boys and girls.

1. *The School Canteen*, 1939–40, and *The School Canteen*, 1941. Price 1s. 3d. each post free. From F. Le Gros Clark, 6, East Common, Harpenden, Herts.

MEDICINE AND THE LAW

The GMC Upheld

IN the same week as the House of Lords decision in the Spackman case there was another challenge to the procedure of the GMC in erasing a practitioner's name from the Medical Register. The Divisional Court upheld the council's action and no appeal seems likely. The Spackman case emphasised the two grounds of erasure—first, a conviction by a criminal court for felony and misdemeanour; and, secondly, a finding by the GMC, after due inquiry, of infamous conduct in a professional respect. In Thomson *v.* General Medical Council the first ground existed. The mere production of a certified copy of the conviction sufficed to give the GMC full jurisdiction to erase the name. The practitioner could not ask the council to say that he was wrongly convicted.

Dr. George Macdonald Thomson, formerly practising at Salisbury and now serving as a private in the Army, was convicted at Kingston (Surrey) of aiding and abetting his wife in making a false declaration with regard to the birth of a child. The child had been registered as born to him and his wife when it was in fact his child by another woman. When the matter came before the GMC in June, 1942, Dr. Thomson did not attend; the erasure of his name was directed. His application (four months later) for reinstatement was refused. He now asked the Divisional Court to order the GMC to restore his name because the inquiry had not been properly conducted, the council's conclusion had been reached on inadmissible and untrue evidence, and the proceedings were contrary to natural justice. His counsel told the Divisional Court that Dr. Thomson did not regard the false registration as a serious offence; it concerned nobody outside his family circle; it was not an offence against society. The Lord Chief Justice intervened to observe that perjury is a grave crime which shakes the very foundations of justice. False registration of a birth, marriage or death "may draw all sorts of rights and interests into inexplicable confusion."

This, however, was not the crux of the case. As soon as the certified copy of the conviction was produced, the GMC could unquestionably proceed to direct the erasure of Dr. Thomson's name. But, in the final stage of its deliberation, the tribunal had inquired what was known about him and had heard the evidence of a detective sergeant. This course is usual in criminal courts, after conviction and before sentence; it enables the judge to decide how to deal with the accused; the information made available may tell in favour of leniency. Earlier this year the Court of Criminal Appeal ruled that it is not proper to encourage evidence given in this way by a police officer to rove over the whole of a man's career. There may be matters which cannot be strictly proved and which the accused may vigorously deny. The criminal courts, however, have not abandoned the practice of asking for information within the permitted scope. The point taken on behalf of Dr. Thomson was, in effect, that the GMC was following the old practice of the criminal courts, the course to which the Court of Criminal Appeal has now set a limit. The Divisional Court, however, has found nothing to justify intervention. What the detective sergeant said to the GMC was in substance what had been said in the criminal court originally. Dr. Thomson, said the Lord Chief Justice, had apparently not considered it worth while to question it at the time. Lord Caldecote could not resist the conclusion that Dr. Thomson was not in a position to contradict any part that would have made any difference to the weight of the information given by the sergeant. Those statements made before the GMC were not inadmissible; they were properly received. There was no irregularity in the proceedings which would justify the court in ordering the GMC to quash its decision.

The Lord Chief Justice added a few sentences about the GMC's statutory authority as a domestic tribunal entrusted with the maintenance of professional standards. "It is the Council's duty," he said, "to discharge those functions and it is not for the court to act as a court of appeal either on the facts or on the decision to erase a name if the Council thinks the facts justify that result." Dr. Thomson's application was accordingly dismissed with costs.

In England Now

A Running Commentary by Peripatetic Correspondents

WITH the BNAF, 1500 hours (1300 by the sun) is not the best time for writing. The heat slows down one's mental processes nearly to a standstill. All my colleagues lie in the shade of their trees, protected from the multifarious forms of insect life by mosquito nets draped from olive branches, and there they doze or read. The Church of England does show signs of activity—the padre is paddling in his canvas bath. "I hear lake water lapping with low sounds by the shore." He is obviously enjoying himself like a baby splashing in the shallow water of a sunny beach on a drowsy summer day. The Roman Catholic padre and his brother from the Church of Scotland have been lulled to sleep by the drone of the cicalas. A gentle breeze makes life reasonably tolerable, but if the wind gets up we shall suffocate in clouds of dust driven from the surrounding tracks graced by such names as Baker St., Harley St., Euston Rd., and the like.

One curious result of living in the open air is the disappearance of my intolerance for certain foods. Radish and cucumber I now eat with impunity, and I put away vast dollops of raw or fried onions without inconvenience. The acid dyspepsia which punctuated my existence in civil life is now but a memory; I wouldn't know that I had a stomach. No doubt I eat twice as much as the average civilian at home, and in particular I consume large amounts of butter (or margarine) and cheese. On the other hand, we get less fat in prepared foods—cake, pastry and so on—owing to the cook's lack of imagination and initiative. Every week we get two or three bars of chocolate, but in this heat my appetite for chocolate is nothing like what it was on cold days at home. For one thing, chocolate increases thirst, so much so that I feel distinctly uncomfortable for a few minutes after eating a piece. Once it is issued our chocolate must be eaten right away or precautions taken to insulate it against the heat. Otherwise it soon starts to trickle down one's book or equipment. Another godsend is freedom from neurotic symptoms. At home I used to suffer from functional dyspnœa and the beastly general exhaustion which it produces after a few days. (How keenly interested I was in Dr. Doris Baker's article on the complaint a few years back.) When I have been discussing the syndrome in outpatients I have often seen students eyeing me curiously as I set out the symptoms in suspicious detail. By way of a change I used to have exacerbations of globus hystericus. Since I joined the Army I haven't had a trace of these disorders. I wouldn't give the impression that life is now one long rejoicing in radiant health and mental tranquility. I still have my bouts of exasperation and frustration, but there is never any doubt about their cause, and that knowledge brings reassurance. I now present, too, a gratifyingly fierce appearance in my moments of anger, for my hair has been clipped short all over, my face is tanned, and my sclerotics, by contrast, have a startling whiteness when untinged by mepacrine; my Army glasses complete an ensemble which would pass muster at a Nuremburg festival.

* * *

In conversation with the superintendent of a NHI pricing bureau I incautiously mentioned prescribing. The bureau deals with prescriptions by the million, and the superintendent only sees those which defeat the ingenuity of the pricers, so his views of prescribers' habits were a little coloured. What prescriptions some of them were! Bad writing explained some of the difficulties—for example, Tab. 'Multivite' was interpreted by the chemist as Tab. Phenobarbitone; there is no record of the patient's reactions. Nor do we hear what happened to the patient ordered Malt Extract who received Mist. Alb. ℥x. Ung. Sulph. became Mag. Sulph—a perhaps excusable error, though the directions the doctor gave the patient must have been hard to carry out. The chemist must have scratched his head a long time over 'Metatone' ℥vi before he turned it into Linctus Codeinæ NF. One prescriber had the habit of contracting Extract of Malt with Cod-liver Oil to the mystic formula EOMCLO, and on one occasion this produced zinc ointment. Mist. Nuc. Vom. Acid ℥xii was read by the chemist as Pulv. Bismuth Co. NF. But the prize in this section must go

to the doctor who signed his name in the body of the script instead of the appropriate place, with the result that the patient was dispensed 6 oz. of catheter lubricant. Too many prescriptions are still being ordered from the obsolete National Formulary, and lots of people don't seem to have digested the Memorandum on Economy in Drugs. There were, too, instances of aberrations or pure errors excusable perhaps in the over-worked GP, though when a cough mixture script is sent for pricing with the normal infusion replaced by Tinct. Nuc. Vom. ad ℥viii, one can only be glad that the doctor did not dispense himself; but of course he would have noticed the error when he came to his dispensary counter. One prescription puzzled the superintendent mightily: it read ℞ Ung. Hydrag. mitte ℥vi. Sig. ℥i t.i.d., a.c.

Finally, prescriptions are still coming in containing quinine in such combination that it is clearly not prescribed for malaria. There must be some doctors who never read any medical journals whatsoever.

* * *

This year I was able to see only two of the Plays at Stratford, *The Merry Wives*—too heavily cut, I thought—went only fairly merrily. Mr. Baliol Holloway, having neither the body nor the mind of Falstaff, could hardly be expected to be at his best, and Mr. Abraham Sofaer as Ford struck altogether too tragic a note of self-pity; I prefer my Fords jumping about ridiculously in a high-pitched frenzy, a veritable ecstasy, of jealousy. Mistress Ford and Mistress Page got much, though by no means all, the fun to be got out of their conspiracy. Had I a penny for every time I have read *Othello* it would be a great help towards meeting the income-tax but this was the first time I had seen it played. What an engrossing play it is. And what a build-up—even without the "Willow" scene, also rashly cut in this production. How, I wonder, does Will avoid giving us a feeling of anticlimax after Desdemona's death? This poor lady was strangled instead of being smothered and one felt that a little timely artificial respiration by Emilia might have worked wonders. Here Mr. Holloway as Iago was much more at his ease, and Mr. Sofaer, had he been better produced, might have made a great instead of merely a sound job of Othello. He has the voice and the presence but when he ordered them to silence that Dreadful bell he could and should have been much more awe-inspiring. He ought to hear my partner deliver that line when the telephone rings.

* * *

If this should meet the eye of any youth, who future days has pawned for present need, instant and urgent at his country's cry, who left the learning of his chosen art, smelting the jewelled sword, his heart's desire, into some primal, crude, compelling blade, yet would knapsack a memento of his love, remember then that War though thief of youth pays for his service with no common coin—no common task is yours—remember Captain Thomas Sydenham.

He went to Oxford in his eighteenth year in the spring of '42 and left to join up a few months later. He served in several campaigns and was wounded. He lost two brothers in different theatres of war and his mother was killed by enemy action. He was 39 before he took half of the Conjoint—the LRCP—and as a result of his interrupted studies his Latin was such that he got a friend to translate the labours of his pen and fruits of his mind.

Yet, because much of his study had been made in the saddle, he saw further than others; because he bedded often on her earth, he gazed more truly into Nature's eyes; because death and anguish compassed him very nearly, he had a wider compassion; because in times of peril he acted on his own reckoning, he was not too nice in following tradition—in fact he made tradition and became one of the fathers of that many-sired affair, modern medicine. May the turmoils of this time throw up his like.

* * *

I was waiting in the station the other night after a spot of leave, studying the train indicator board hopefully. All around was the noise and bustle found at most stations these days, but beside me were two silent men relying on each other for support. The silence persisted for quite a time, while they swayed gently, concentrating

Continued at foot of opposite column

Public Health

AN EMERGENCY METHOD FOR THE STERILISATION OF WATER

ARNOLD RENSHAW, M D LOND, D P H
DIRECTOR OF THE LABORATORY OF APPLIED PATHOLOGY AND PREVENTIVE MEDICINE, MANCHESTER

IODINE is an outstandingly effective agent for sterilising potable water, and possesses certain advantages which deserve attention just now, when the risk of water-borne infection is abnormally high. I have found that when 1 ml. of typhoid culture is mixed with 100 ml. of ordinary tap water to which an aqueous solution of iodine and potassium iodide (Lugol's solution) had been added to give a proportion of 1 part of free iodine in 20,000 parts of the water, complete sterilisation was effected within ten minutes. I then went on to test the action of iodine against *Bact. coli*, *B. typhosus*, *B. paratyphosus A* and *B*, *B. dysenteriæ* (Flexner, Shiga, and Gaertner), and *Vibr. choleræ*. In each case, 1 ml. of a fresh 24 to 48 hour broth culture was added to 99 ml. of a series of dilutions of iodine and potassium iodide in water, left for ten minutes, then 1 ml. plated on agar and the colonies counted after incubation (table I).

TABLE I—ACTION OF IODINE IN VARIOUS DILUTIONS
Number of Colonies per 100 ml. of Iodine-treated Water

Organism	Iodine used in dilution of					Control: No iodine
	1:13,333	1:20,000	1:40,000	1:80,000	1:200,000	
						Mill.
Coli	sterile	sterile	6000	100	1 mill.	22–59
Typhosus ..	sterile	sterile	< 100	< 200	49,500	5–108
Paratyph. A.	sterile	sterile	< 100	..	..	9–15
Paratyph. B.	sterile	sterile	< 100	200	..	0·6–11
Dys. (Flexner)	sterile	sterile	sterile	< 100	..	11–84
Dys. (Shiga)	sterile	sterile	sterile	sterile	100	18–73
Dys. (Gaertner)	sterile	sterile	sterile	211,000	..	24–126
Chol. (tap water	sterile	sterile	sterile	sterile	6600	0·5–28
Chol. (aq. dest.)	..	sterile	sterile	sterile	< 100	4·4

(Where an antiseptic dilution showed no growth on the plate inoculated with 1 ml., but growth in 50 ml., the count is regarded as < 100). Mill. = millions.

In these tests the rate of infectivity of the water was very high; in very few cases were there less than 500,000 organisms per 100 ml., and the number rose in some experiments to as much as 100 million or even higher. The total-ammonia content of 1 ml. of the broth used was 0·98 part per 100,000—about half the total in a sewage effluent. Despite the heavy concentration of bacterial and organic pollution, however, a 1:20,000 dilution of iodine was sufficient to effect complete sterilisation, against all the organisms named, within ten minutes of treating the infected water. Where distilled water was substituted for ordinary tap water, an even greater dilution was possible. If therefore the organic pollution effected by 1 ml. of broth had been in the order of 0·1 ml., it is possible that even more effective ranges would have been recorded; but the degree of organic pollution effected by 1 ml. of broth can be taken to represent fairly well the degree

Continued from previous column

on the battle with gravity, then one suddenly remarked, "You'll no see a Glesca man in a lavatory on a Setarday nicht wi' a bottle o' milk." There was a longish pause while his chum thought it over. "Naw"—he was in complete agreement. I was thinking it over later. The first man might have been complaining about the lack of facilities provided by the railway directors. It could have been that Lord Woolton was being taken to task for not making supplies available. But to me it sounded like civic pride.

* * *

Revisiting a country house after an interval of twenty years I was surprised to find how it had shrunk. The drive had lost at least half its length and the meadows on either side of it (now under corn) had dwindled proportionately. The once spacious entrance hall is now not much more than a vestibule, the Big drawing room is quite little and the Little drawing room tiny. The only thing that had not shrunk was the welcome I received from its inhabitants. That, at least, was as large as ever.

of pollution which might be present in waters drunk by troops and others under circumstances requiring sterilisation of water. This is important, since much of the effective iodine is absorbed by the organic constituents of polluted water, leaving a much lesser amount for bactericidal activity.

To compare the relative merits of chlorine and iodine, 1 ml. of a recent 48-hour broth culture of *V. choleræ* was added to distilled water, which with the added antiseptic totalled 100 ml. The following dilutions of iodine and bleach solution were tested (table II) and allowed to act for ten minutes, after which 1 ml. quantities were plated out on to agar, and 50 ml. quantities were poured into double strength peptone water. The strength of chlorine was estimated immediately before the experiment, colorimetrically and by titration with sodium arsenite solution. The water used contained 4,372,000 vibrios per 100 ml.

TABLE II—ACTION OF IODINE AND CHLORINE COMPARED

Dilution	Iodine	Chlorine	Dilution	Iodine	Chlorine
1:20,000	sterile	sterile	1:160,000	<100*	sterile
1:40,000	sterile	sterile	1:400,000	600	17,000
1:80,000	sterile	sterile			

* 1 ml. sterile; 50 ml. positive.

The volume of iodine solution when added to 100 ml. of water corresponding to an ultimate dilution of 1:20,000 was only 0·1 ml., as compared wth 2·5 ml., of bleach solution; so that only one twenty-fifth of the volume of iodine solution need be carried for ready and instant use as compared with bleach solution. One ml. of Lugol's iodine per litre of water usually suffices to ensure complete sterility within ten minutes. Any excess can be removed by filtration through activated charcoal. Moreover the colour of the iodine solution, when added to the water to be treated, gives the user some idea as to whether an adequate amount has been added. If the faintest yellow tinge is left at the end of ten minutes, the water can normally be regarded as freed from the contaminating organisms which have been the subject of these experiments. Moreover, unlike ordinary bleach solutions, the iodine solution keeps well. Should it be desired to make doubly sure, amounts of iodine solution can be added to the water sufficient to impart a definite yellow tinge which still persists at the expiry of ten minutes. The water may then be shaken with, or filtered through, activated charcoal which will absorb any excess of iodine. Cost is very low in view of the results obtainable.

These experiments show that iodine possesses extremely effective action against the organisms responsible for typhoid, paratyphoid, cholera and bacillary dysentery. This antiseptic action is effective within ten minutes for the purpose of sterilising water. It should prove useful as an emergency method of sterilisation by the civilian population, by isolated units of troops, and in other circumstances where a concentrated, stable and potable antiseptic is indicated.

Infectious Disease in England and Wales

WEEK ENDED AUG. 7

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1520; whooping-cough, 1614; diphtheria, 493; paratyphoid, 5; typhoid, 8; measles (excluding rubella), 1903; pneumonia (primary or influenzal), 484; puerperal pyrexia, 170; cerebrospinal fever, 34; poliomyelitis, 16; polio-encephalitis, 0; encephalitis lethargica, 1; dysentery, 122; ophthalmia neonatorum, 75. No case of cholera, plague or typhus fever was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 2 (0) from measles, 8 (2) from whooping-cough, 8 (0) from diphtheria, 33 (6) from diarrhœa and enteritis under two years, and 3 (0) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 191 (corresponding to a rate of 32 per thousand total births), including 15 in London.

CORRIGENDUM.—In our issue of Aug. 7, p. 162, the price of *Essentials of General Anæsthesia* by Macintosh and Bannister was given as 16*s.* instead of 25*s.*

Letters to the Editor

TAKING THE STING OUT OF PROFLAVINE

SIR,—There is every reason why proflavine should replace the more toxic acriflavine, but a word of caution is necessary. Proflavine is available mainly as the pharmacopœial "proflavine sulphate," which is actually the acid sulphate analogous to the bisulphate of quinine. We find that a 0·1% solution of proflavine sulphate has a pH of 2·5 as measured with a glass electrode. This degree of acidity must be highly irritating and possibly damaging to delicate tissues (cf. Russell, D. and Falconer, M. *Brit. J. Surg.* 1941, **28**, 472). It is easy to overcome this drawback by converting the acid salt to the normal salt at the time of dispensing. For instance, a 0·1% aqueous solution may be prepared by warming 1 gramme of proflavine sulphate and 0·25 g. of sodium bicarbonate with 40 ml. of water until dissolved, and diluting to a litre. This solution has a pH of 6·0 and should be bland.

There is no reason why neutral salts of proflavine should be unavailable. In a forthcoming issue of the *Pharmaceutical Journal* we describe not only the above solution but the preparation of several other neutral salts, including the benzoate, benzene sulphonate and salicylate, which are soluble in 60, 110 and 430 parts of cold water respectively and equal to the official salt in antibacterial action. The powder therapy of wounds along the lines advocated by Mitchell and Buttle would undoubtedly give better results if one of these neutral salts were used, not only on account of the absence of acid necrosis but also because these salts have a constant solubility, whereas the solubility of the acid sulphate (1 in 300) increases, in proportion as it is neutralised by the tissue juices, to that of the neutral sulphate, which we find is 1 in 4.

ADRIEN ALBERT.
The University, Sydney. WALTER GLEDHILL.

PULMONARY TUBERCLE IN CHILDREN

SIR,—Dr. Toussaint chides me with criticising the work of tuberculosis officers in London, and regards such criticism as based on false assumptions. The particular child referred to in his letter was a boy, a member of a tuberculous household, who was evacuated from London, and subsequently, to the best of our belief, infected 10 of his class mates and 3 of his co-billetees before his tuberculous disease was discovered. His discovery was primarily due to the acumen of the general practitioner in Sussex, but for whom he would have continued to disseminate infection. Although the boy had been evacuated for more than a year before admission to Cuckfield EMS Hospital, his pulmonary lesions were of a chronic adult type with extensive cavity formation, and I feel in no doubt that his infection was present before he left London.

Our investigations into the source of infection in evacuated tuberculous children were made possible by the close coöperation of the county health authorities for East Sussex, to whose help I am indebted. When correspondence with the appropriate authority in London was required, this was carried out for us by the county authority. Dr. Toussaint is surprised that no attempt was made to obtain the previous history of contact examination in the case under consideration. The fact is that the other children whom the boy infected came from an adjacent borough, and correspondence passed between our county authority and the MOH of that borough, and was at our disposal. I regret that correspondence did not materialise with Dr. Toussaint, otherwise we might have learnt earlier that this boy having a positive tuberculin skin test in 1933, and known at that time to be a contact case, was eventually X rayed in 1936. It is my opinion that, for the early detection of intrathoracic tuberculosis in a child, clinical examination alone is not enough; it should be supported by both X-ray and skin-test investigation.

I fully appreciate the impossibility of notifying reception areas, during the turmoil of September, 1939, about evacuated children who had been in contact with phthisis before going to the country; but had such information been supplied even a few months later, so that suspected children could be kept under observation while in the country, much illness and spread of infection might

have been avoided. For reception areas to have to discover these children because of the severity of their illness, and then work back to their prewar history to find a possible source of contact, has been to shut the stable door after the horse has bolted. We must all hope that mass evacuation of children will never be repeated; but should it become necessary, and if we are to profit by past experience, two lessons learned at Cuckfield are: (1) that lay billeting officers should be furnished by their MOH with a list of households that must not accept healthy children on account of the presence of a phthisical adult; (2) that reception areas should be informed of children who before evacuation have been exposed to a known risk of infection, so that their close supervision may be continued.

Dr. Toussaint, I feel, raises an important point when he says it is beyond the bounds of reasonable expectation to extend supervision to nephews, nieces and cousins, who may visit a tuberculous adult. No-one would deny that most children with intrathoracic tuberculosis are infected by members of their own household; but instances in which children are infected as a result of ascertainable contacts outside their immediate family circle arise with sufficient frequence to make it imperative to widen the scope of inquiry into possible contacts. Thereby not only will young children have a better prospect of their infection being detected early, but unsuspected adult sources of infection may be brought to light, and their capacity to spread infection be checked.

London, W.C.1. WILFRID SHELDON.

SWABBING OF CONTACTS IN DIPHTHERIA

SIR,—I also share the astonishment of "Pathologists" and Dr. Downie at the statements made in the memo you published on July 3 from the fever group of the Society of MOHs. In this district, during the latter part of 1941, when the percentage of susceptibles was very high I was faced with an epidemic of diphtheria which threatened to assume considerable proportions, if previous experience was anything to go by. At a large secondary school where out of 313 scholars only 30% had been immunised and where the disease first appeared, 10 carriers were discovered by swabbing the whole school. Of these carriers 8 were gravis and 2 were mitis types. Coincidently with this outbreak, diphtheria was notified in children attending a senior girls elementary school where out of 251 attending only 10% had been immunised previously. Out of this number, 5 carriers were found by mass swabbing (3 gravis, 1 intermedius and 1 mitis). The swabbing of a large number of scholars in 15 other schools uncovered six other centres after swabbing some 60% of the total school population in this region.

The following facts emerged from the investigation:—

1. Three main centres were uncovered, with five secondaries of a lesser degree.

2. No carriers were found in any infant school investigated; which contrasted with my own experience of 10 or 12 years ago when, in an infant school of 240 scholars, 22 virulent carriers were discovered by swabbing the whole school.

3. Of 2176 children examined, from whom 2304 swabs were taken in the months of November and December 1941, 27 carriers were discovered. Of these carriers, 19 were gravis, 3 were intermedius and 5 were mitis types—that is, 1·2% of the total examined. A number of the carriers were persistent and were only cleared after tonsillectomy.

4. Six carriers had been immunised previously (4 gravis, 1 intermedius, and 1 mitis).

5. A number of carriers were spotted by swabbing, following complaints that the children had sore arms after being dosed with TAF. (Zinsser, 3rd ed., Infection and Resistance, p. 532, mentions this phenomenon with toxin-antitoxin mixtures.)

There is no doubt in my mind that the detection and isolation from school of these carriers limited the incidence of diphtheria to a considerable degree. This, combined with heavy immunisation of the remainder at a rapid rate, stamped out the epidemic before it could get a real hold. Had the carriers been left at school and immunisation alone been relied upon, the disease would have had a better chance to extend, for the full effect of immunisation is not operative until some weeks following completion of the course. Since the percentage of those immunised has risen to a more satisfactory level (it is now 95% for those between 5–15 years and 80% for those aged 1–5 years), diphtheria has disappeared from this district; during the last 18 months one case only has been brought to light and that was in an unimmunised girl aged 17. Since 1938 not a single case of diphtheria has been proved in any person who had previously completed a course of diphtheria immunisation.

Heanor UD, Notts. P. H. J. TURTON, Medical Officer of Health.

CALIBRATING THE PELVIC CANAL

SIR,—It was with gratitude that I read in your leader of Aug. 7 the sentence: "It is wrong to suppose that the radiologist can now supplant the clinician in deciding the best treatment in doubtful cases of obstetric disproportion." I do not say, though I am unaware of them, that correct and reliable techniques have not been evolved for X-ray pelvic measurement. I assert that they are unnecessary. X-ray measurement is but one, and that an uncertain, attempt to measure the factors concerned in labour. If an X-ray picture could assess the strength of the uterine contractions, the woman's general health, her psychological state, and then give us a mathematically accurate measurement of the pelvic canal, and the fœtal head, *but only when labour has started*, it might convert the confirmed clinician to its use. Until then, radiological measurement of the pregnant pelvis must remain more of an academic plaything than a practical necessity. I must exclude a necessary X-ray picture in (say) the case of a suspected bony tumour of the pelvis, though I still think that such a tumour is easy of diagnostic access by the examining finger.

I am unaware of any research into the effect of X rays on the fœtus. Perhaps the time at our disposal has been too short for such a long-term inquiry; nevertheless, I feel that if the rapidly growing cell is more susceptible to the shorter wave-lengths than his more mature and sedate brother, then the developing cells of the fœtus may not be as immune as we care to think from even a short exposure.

There is a certain type of childish mind, common to some doctors and many patients, which confuses diagnostic aids with diagnosis. For them the shining callipers and the X-ray picture will no doubt remain. But since it is certain that disproportion cannot be proved to exist until labour begins, I heartily deprecate the use of a very uncertain diagnostic aid which too often causes fear in the patient, unconsidered action by the doctor, and for all we know, harm to the fœtus.

Wimpole Street, W.1. M. P. REDDINGTON.

SERIAL SPINAL ANALGESIA

SIR,—I should like to congratulate Dr. Lee on his instructive article in your issue of Aug. 7. He is, so far as I am aware, the first British anæsthetist to employ serial spinal analgesia, and much credit is due to his skill and perseverance in mastering this new technique so successfully as to have no untoward complications in a series of 105 cases. His use of the word "serial" is an improvement on "continuous," as used by American authors; but "fractional" seems to be more apt in describing Lemmon's method.

A number of anæsthetists have told me they have refrained from using continuous spinal analgesia on account of the added risks of meningitis. But Lemmon and Paschal described over 1000 cases without one instance of this complication, and in Lee's smaller series also this grave sequel was absent. Among his series there were nine upon which I performed antecolic Polya-Hofmeister subtotal gastrectomy for simple ulcer, and in none was there any postoperative complication or distressing symptom such as headache or urinary trouble. All were able to leave hospital, ambulant and on full diet, within 15 days of operation. It is true that for gastric operations the method is applicable only to the good-risk cases; no anæsthetist would advise its employment for patients who are old and infirm, for the obese, or for those in whom the systolic blood-pressure is below 120. It is the ideal anæsthetic for protracted abdominal operations such as subtotal gastrectomy for jejunal ulcer and for difficult cases of gastrojejunocolic fistula.

I agree with those who consider it unnecessary and perhaps unwise to inject serial doses into the theca for minor surgical procedures or for operations unlikely to

take more than an hour. Lee, however, maintains that the technique is so simple, once it has been mastered, that in the absence of any definite reason to the contrary this form of anæsthetic can be applied with equal success and with perfect control to any procedure, major or minor, below the nipple line. Certainly this method of Lemmon's, as adapted and modified by Lee, deserves extended trial by anæsthetists in this country.

Wimpole Street, W.1. RODNEY MAINGOT.

INHIBITION OF PROTEUS IN CULTURES FROM WOUNDS

SIR,—Professor Miles and Miss Hayward have done a service to hospital bacteriologists everywhere by calling attention to this everyday difficulty (*Lancet*, July 24). Like them we have found that the modified Fry method [1] enables us to recognise and isolate several organisms, especially hæmolytic streptococci and staphylococci and non-hæmolytic streptococci, more satisfactorily than any of the other procedures which have been suggested. (We have not concerned ourselves with strict anaerobes and have not tried the 6–8% agar which Professor Miles is now using.)

The modified Fry method is, however, uneconomical in that it involves planting two plates from every wound in which proteus may be present. To overcome this difficulty the following device was proposed by one of us (W. C. C.).

A ditch about 6 mm. wide is cut out of a blood-agar plate, separating off the area (F), approximately one-third

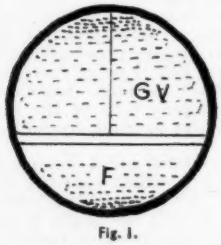


Fig. 1.

Fig. 2.

of the whole, from the remainder (fig. 1). The swab from the wound or burn is now inoculated as shown (dotted line) on both areas. F is now flooded with a thin layer of melted agar at 45° C. (Fry procedure), care being taken that the agar covers the whole surface but does not also spill over into the ditch. Over half of the remaining area, if desired, a drop of 1 in 3000 gentian-violet can be spread (area GV) to suppress staphylococci and diphtheroid bacilli, and favour the detection of hæmolytic streptococci (Garrod,[2] Fleming[3]). As soon as the supernatant layer of agar on area F has set, this area only is flooded with a drop or two of absolute alcohol, which is left for about one minute (Butcher's modification of the Fry method), and the plate subsequently dried off for 10–15 minutes.

After incubation the surface of the agar on area F almost always remains free from growth and it is easy, with a little experience, to recognise the underlying colonies of hæmolytic streptococci, staphylococci, &c. If these require to be isolated —or if there is doubt about their identity—subcultures are made by stabbing through the supernatant agar layer with a straight wire and planting on one or more sectors of a plate divided by ditches, as shown in fig. 2. If any of the doubtful colonies turn out to be proteus they will not spread across the ditches.

This simple procedure has proved very satisfactory during the past twelve months with about 1000 swabs from burns in which proteus was present along with other organisms.

The following experience supports Professor Miles's criticism of the method employed by Major Pulvertaft [4]:

A swab from a burn, infected with proteus, staphylococcus and hæmolytic streptococcus was planted on: (*a*) a Fry ditch-plate prepared as above; (*b*) an alcohol-dried plate (methylated spirit 30 seconds); (*c*) an alcohol-dried plate, but spirit left for 3 minutes.

On plate *a* the Fry sector grew 15 colonies of hæmolytic streptococci and some non-hæmolytic colonies; on the other sector proteus had swarmed and there were other colonies. Plate *b*, after 24 hours showed 3 colonies of hæmolytic streptococci and a few staphylococci. After 48 hours proteus was beginning to swarm and the hæmolytic streptococci were not recognisable. Plate *c*, after 24 hours showed no growth. After 48 hours there were many colonies of proteus (not swarming) and some staphylococci. No colonies of hæmolytic streptococcus were recognisable.

It is evident that even a few seconds' exposure to alcohol had a considerable effect on the medium (plates *b* and *c*), and that relatively slight variations in that exposure might yield misleading results.

W. C. CAWSTON,
Glasgow. L. COLEBROOK.

1. Spooner, E. T. C. *J. Hyg. Camb.* 1941, **41**, 320.
2. Garrod, L. P. *St. Bart's Hosp. Rep.* 1933, **66**, 203.
3. Fleming, A. *Brit. med. J.* 1942, **i**, 547.
4. Pulvertaft, R. J. V. *Lancet*, 1943, **ii**, 1.

FORMATION OF RED BLOOD CORPUSCLES

SIR,—In view of the evident interest of Dr. Duran-Jorda in the genesis of blood-cells, failure to draw his attention to the delights of hæmatological literature would be a failure in true hospitality. Violent controversy raged around the subject from the early years of this century until the death in 1938 of Naegeli, and rumblings were heard even as late as 1940. Battles were fought between the great guns—Dantschakoff, Dominici, Ehrlich, Ferrata, Hirschfeld, Jolly, Maximow, Naegeli, Pappenheim, Schilling, Schridde, Weidenreich, besides others still living—over methods of staining and observation, and suitability of material, embryological, adult and pathological. Beliefs were held with religious fervour and titles. Naegeli, known as the Blood Pope, led the Dualists, Maximow the "extreme Unitarians." Hard blows were given and taken, but this surely is the unkindest cut of all, that a diligent bench worker has ignored them in a country whose libraries have not yet been destroyed.

Mill Hill. B. D. PULLINGER.

TREATMENT OF OSTEOCLASTOMA

SIR,—The controversy aroused by Dr. Brailsford's article only shows that the formation in this country of a central registry of bone-tumours is long overdue. The bone-tumour subcommittee of the British Orthopædic Association fails to meet this want since it appears to be composed exclusively of orthopædic surgeons, and few can be satisfied with the results of surgical treatment. We should take as our model the American Registry which is composed of surgeons, pathologists and radiologists.

Cambridge. FF. ROBERTS.

MR. HUXLEY'S EYES

SIR,—Professor Hartridge says in his letter of July 17 that I gave no grounds for my statement that his theory is untenable. My grounds are that according to certain basic facts of ocular pathology no corneal deposits could possibly have been present in Mr. Huxley's case.

Wimpole Street, W.1. R. AFFLECK GREEVES.

LIBRARIES AND LEARNED PERIODICALS

SIR,—In my letter of July 17 I inadvertently failed to appreciate the proposals of a committee of the Association of Special Libraries and Information Bureaux, which has under consideration the preparation of a Union Catalogue of Periodicals in British Libraries.

ASLIB has been dealing with this problem since its conference last November and the committee which it is forming is inviting representation of the bodies to which I referred. The committee moreover proposes at present to limit its plan to the compilation of a consolidated check list composed of entries in the *World List of Scientific Periodicals*, the *Union Catalogue of Periodical Publications in University Libraries*, and the relevant section of the *British Museum Catalogue*. The proposed constitution of the committee, and the limited scope of its immediate programme, remove the scheme from any criticism which might have been implied in the latter part of my letter; and the work which it contemplates should be of assistance in the accomplishment of the larger scheme which I outlined.

London School of Hygiene and Tropical Medicine. CYRIL C. BARNARD, Librarian.

DOCTORS AND NURSES FOR CHINA

SIR,—In the spring of last year you inserted a letter from me asking for offers from doctors and nurses for service in a Red Cross hospital unit in China. Twenty-one were selected and sent out under Dr. W. S. Flowers and have established a base hospital at Changsha, Hunan. Sick and wounded, both civilian and military, are being treated and excellent work is being done. An appeal has now been received by the War Organisation of the British Red Cross and St. John for reinforcements. It is especially desirable that applicants should have a knowledge of the Chinese language or a background of Chinese experience. Further particulars may be obtained from Dr. H. Gordon Thompson at the headquarters of the War Organisation of the British Red Cross and St. John, 14, Grosvenor Crescent, London, S.W.1.

HORDER.

Obituary

Sir GEORGE HASTINGS who died on Aug. 13 in his ninetieth year, was house-physician at St. Bartholomew's Hospital when Andrew, Southey, Church and Gee were physicians and Matthews Duncan physician-accoucheur. He joined the staff of the Westminster General Dispensary, and by 1878 had published in the medical press observations on rheumatism, tetanus and Addison's disease. By the turn of the century he was an established consultant to several London banks and to the Gas Light and Coke Co. But to the modern world he was known as president of the Coaching Club, a meet of which he attended in his 86th year. His wife, who died in 1931, was a daughter of W. P. Frith, painter of "Derby Day."

Major J. N. STRAUSS, who died of smallpox in West Africa in June, qualified from the University of Manchester in 1933. After holding a post in Newcastle an urge to tropical medicine led him to become house-physician to Sir Philip Manson-Bahr at the Hospital for Tropical Diseases in London and later he was awarded a junior MRC research fellowship in his specialty. Strauss volunteered early in the war and was soon abroad. Characteristically he took in his pocket his own microphotographs of essential medical notes. He was rescued from Cretan waters and worked by Tobruk harbour when Axis bombing was at its heaviest there. On leave in England he took his MRCP and married Sybil Bowyer, SRN, of the London Hospital. He was then directed to West Africa, where his knowledge, skill and good humour had scope. E. D. writes: Joel Strauss had an exceptional mind, nimble, neat and lucid. He tackled difficulties with courage and wit. He knew how to work and it was a pleasure to work with him. His interests, which were never superficial, included photography, knots, astronomy and fell-walking.

Dr. ARCHIBALD WARNOCK, youngest son of Mr. John Warnock of Golfhill by Airdrie, was killed in a flying accident on May 7. He was educated at Coatbridge High and Secondary Schools and at Glasgow University where he graduated MB in 1941. After holding resident appointments in Glasgow Royal Infirmary and the Lanarkshire County Fevers Hospital, Motherwell, he was commisioned in the RAFVR in 1942 and served at operational stations in this country. A cheerful man, keen on sport, Archie Warnock excelled at squash rackets and tennis. His friends will recall his keen mind and sharp wit and perhaps above all his amusing impersonations. He was 25 years of age and unmarried.

Annan, Glasgow

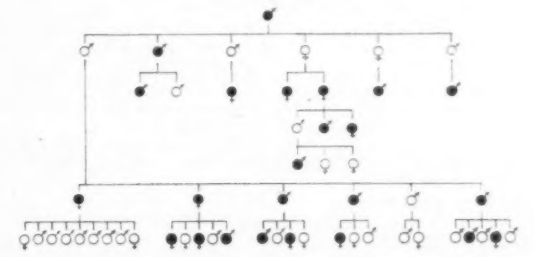
Notes and News

A RHEUMATIC FAMILY

W. N. PICKLES, M D LOND, M R C P

AFTER many years in country practice, my experience of rheumatic fever and rheumatic heart disease had been so meagre that I felt justified in considering them locally very rare. It then dawned on me that the sufferers mostly belonged to one large family and more than once the disease was discovered before the relationship. It was found possible to work out a family tree and to show that out of 53 descendants of a man—himself a victim—who died long before my time, 23 had suffered from rheumatic fever or had unmistakable signs of mitral stenosis. Besides the original victim I had to accept hearsay evidence of but three others, having myself attended and examined the remaining 20. Of these, 10 have died; one from an accident in youth, the others from heart disease between the ages of 48 and 70. Four with rheumatic fever have come under my care—2 only developing heart lesions. Nine with such lesions gave a history of rheumatic fever and 5 lesions were discovered without relevant history. One young woman developed mitral stenosis after tonsilitis and her sister after tonsillectomy.

The causation of rheumatic fever is rightly one of the important objects of research at the present time, and as



Black circles indicate members of the family with a history of rheumatic fever or signs of mitral stenosis.

environmental influence is bound to loom large, it is as well to remember the existence of such families.

It is interesting and important to know what manner of people are being studied and something about their lives. After 30 years' close experience, I have no hesitation in singling these people out as among the most outstanding in the district. With insignificant exceptions they are prosperous and there is evidence that they always have been prosperous, well-housed and well-fed. In personal appearance they are much above the average, tall and broad with an unselfconscious dignified carriage. They have a proper and justified family pride and a sense of inheritance, claiming descent from a follower of Alan of Brittany upon whom the Conqueror bestowed Richmondshire. They are as a rule successful farmers but a switch-over to other occupations has simply meant adaptation of talents and success in a new sphere.

The victims of mitral stenosis do not seem to follow the usual rules for this disease. The men live the strenuous lives of hill farmers. The women, besides doing the heavy work of the farmer's wife, bear children and feed them at the breast, and all positively refuse to believe that any care is needed. Yet none of these sufferers has up to the present died from heart disease at an early age. The diagram shows the sufferers in black and spouses are omitted. In no instance was the spouse rheumatic, so that the story is uncomplicated.

It is futile to speculate on the destiny of this remarkable family. "It is not observed in history that families improve with time" may well prove true in a medical sense. It may be that environment has hitherto been so favourable for this family that it has helped its members in part to elude the shackles of inheritance.

I am indebted to Miss Marie Hartley, of Askrigg, for the diagram.

FLUORINE OSTEOSCLEROSIS

THE first case of chronic fluorosis of endemic origin affecting the skeletal system to be described in the United States was in a man who had lived for many years in parts of Texas where endemic fluorosis is prevalent, the fluorine content of the drinking waters ranging from 4·4 to 12·0 p.p.m. Besides mottled dental enamel this man showed a severe anæmia; abnormal amounts of fluorine were detected in his teeth and bones. J. F. Linsman and C. A. McMurray, who report the case (*Radiology*, 1943, **40**, 474), suggest that, in areas where the drinking water contains over 3 p.p.m. of fluorine, sclerosis in the blood-forming marrow may give rise to a secondary anæmia. In India, C. G. Pundit and his associates have shown that when fluorine-containing waters are drunk an adequate diet is necessary if skeletal deformity is to be avoided, while in England, Kemp, Murray and Wilson pointed out that the production of characteristic changes in the vertebræ seems to depend on other factors besides fluorine intake, one being the general nutrition. Another source of fluorine in addition to natural waters has recently assumed importance. Rock phosphate, which contains up to 3·5% of fluorine, is probably being imported in increasing amounts from North Africa for use in fertilisers, and may reach water-supplies. It has also been shown that, under war conditions when phosphates of approved origin are not easily available, phosphates containing fluorine are finding their way into articles of food prepared for human consumption.

University of Oxford

On July 24 and 31 the following degrees were conferred:

MCh.—J. P. Childs and *A. N. Gutkelch.

DM.—R. H. Gardiner.

BM.—J. M. Rice-Oxley, G. D. Bolsover, G. S. Dawes, Anthony Roper, George Gordon, R. D. K. Levy, *Philippe Shubik, *T. C. Bradshaw, *C. W. Bartley, *J. H. Cumberland, J. E. French, Miles Weatherall, A. A. C. Dutton, G. J. Fraenkel, Cynthia M. Phillips, and Eileen C. Mercer.

At a recent examination for the diploma in ophthalmology the following candidates were successful:

F. P. Calhoun, Kathleen Davies-Thomas, Arnost Hirtenstein, H. C. Kodihinge, Anna M. MacMahon, Nora M. Oughton, Jean M. G. Shaw, and Bezley Thorne-Thorne.

Medical Casualties

The following casualties among RAMC officers have been lately announced:

Wounded.—Captain D. M. Cathie, MB GLASG.

Prisoner of War.—Major H. J. Anderson, MB; Captain W. T. G. Atkins, MB SYDNEY; Lieutenant M. G. Braham, LMSSA; Captain W. R. Grant; Captain J. F. Pantridge, MB BELF; Major J. A. Reid, LRCPE; Captain Conrad Rigby, MB LPOOL; Captain Alfred Roy, MB GLASG.

Safety Training Exhibition

The Royal Society for the Prevention of Accidents is holding an exhibition at the Dorland Hall, Lower Regent Street, London, S.W.1, from Sept. 3 to 17. Further particulars may be had from the secretary of the society, Terminal House, 52, Grosvenor Gardens, S.W.1.

Lectures on War Surgery

On Aug. 18 Sir James Walton gave the first of a series of eight lectures, arranged by the British Medical Students Association. The lectures will be given at University College Hospital medical school at 4.30 PM every Wednesday till Oct. 6, and the programme is: Dr. J. Trueta, the biological treatment of war wounds and fractures; Mr. A. Tudor Edwards, wounds of the thorax; Major-General C. Max Page, surgery in the field; Mr. A. H. McIndoe, injuries of the face; Colonel Elliott C. Cutler, American views; Mr. H. J. B. Atkins, burns; and Surgeon Rear-Admiral G. Gordon Taylor, sea injuries and problems of shipwrecked seamen. Tickets, available only to members of the association, may be had from the BMSA representative in each school.

Rehabilitation for Seamen

The Liverpool Seamen's Welfare Centre to be opened at Summerlands, near Kendal, in November, is the first rest and rehabilitation centre for men of the Merchant Navy. The mansion, which has an estate of 55 acres, will provide free board and lodging for 55 trainees, and a further 20 beds for seamen in need of a fortnight's holiday, who will pay up to 28*s.* a week. Men who have completed the rehabilitation course can remain at Summerlands making light turbine engines or ships' furniture. Later it is hoped to build cottages for the married permanent staff. A similar centre for Merchant Navy officers is also planned.

Colonial Education Commissions

The commission appointed to inquire under the chairmanship of Sir Cyril Asquith into higher education in the colonies includes Prof. A. V. Hill, D SC, and Prof. J. A. Ryle. A commission which will deal particularly with British West Africa has also been nominated, of which Mr. Walter Elliot is to be chairman and Dr. E. H. T. Cummings, MOH of Sierra Leone, one of the members.

Association of Port Health Authorities of the British Isles

The autumn meeting will take place in the City Chambers, Glasgow, at 9.30 AM on Friday, Sept. 3. The speakers will include: Dr. A. D. Briggs, on hospital facilities for merchant seamen; Dr. Alexander Hutchison, on medical services for merchant seamen; Dr. George Buchanan, on medical arrangements for dockers in ports. Further information may be had from the MOH, Public Health Department, 23, Montrose Street, Glasgow.

Association of Speech Therapists

The remedial section of the Association of Teachers of Speech and Drama has now been reconstituted under this name as an autonomous body. Dr. E. J. Boome is president of the new association.

TERMINATION OF EMPLOYMENT.—"Persons whose names are on the Medical Register and who are employed in a professional capacity" are excluded from the provisions of the Control of Employment (Notice of termination of employment) Order 1943, which comes into force on Aug. 20. Accordingly it will be unnecessary for a doctor to notify the local labour exchange when his employment ends.

Captain DONALD JOHNSON, RAMC, has been nominated as Independent candidate in the by-election at Chippenham, Wilts. Dr. Johnson, who is a barrister-at-law and a graduate of Cambridge University, qualified in 1926 and has worked with the Grenfell mission in Labrador.

Appointments

DAVISON, GEORGE, MD DURH., MRCP, DCH: hon. asst. physician to the department of child medicine in the Royal Victoria Infirmary, Newcastle-on-Tyne.

WRIGHT, ELSIE, MD LOND.: hon. asst. physician to the department of child medicine in the Royal Victoria Infirmary, Newcastle-on-Tyne.

Births, Marriages and Deaths

BIRTHS

BEMBRIDGE.—On Aug. 11, at Cardiff, the wife of Lieutenant B. A. Bembridge, RAMC—a son.

GUNN.—On Aug. 11, the wife of Colonel William Gunn, MD, of Glasgow—a daughter.

HUMBLE.—On Aug. 13, in London, the wife of Dr. J. G. Humble—a son.

KELLOCK.—On Aug. 10, in London, the wife of Dr. T. D. Kellock—a daughter.

LAVENDER.—On Aug. 11, the wife of Surgeon Lieut.-Commander D. C. Lavender, RNVR, of New Jersey, U.S.A. and Barnet, Herts—a daughter.

MCCLEAN.—On Aug. 11, the wife of Surgeon Lieutenant Ian McClean, RNVR—a son.

SAWLE THOMAS.—On Aug. 12, at Northampton, the wife of Dr. J. C. Sawle Thomas—a son.

UNGLEY.—On July 30, at Newmachar, Aberdeenshire, the wife of Surgeon Commander C. C. Ungley, RNVR—a daughter.

MARRIAGES

ASHER—ELIOT.—On July 27, in London, Richard Alan John Asher, MRCP, of Earls Colne, Essex, to Margaret Augusta Eliot.

BALY—HUTCHISON.—On Aug. 7, at Shanklin, Peter Leonard Nickson Baly, surgeon lieutenant RNVR, to Suzanne Hutchison.

GILBERT—DON FOX.—On Aug. 7, at Frensham, Surrey, Edward Theodore Gilbert, DSO, OBE, captain RAMC, of Belfast, to Hebe Helen Mary Don Fox, lieutenant RAMC.

GLOVER—LOCHORE.—On Aug. 10, in London, Eric Charles Glover, surgeon lieutenant RNVR, younger son of Dr. J. Alison Glover, to Jean Mary Lochore.

TOWNSEND—REEKS.—On Aug. 7, at St. Albans, Horace Samuel Townsend, MRCS, Colonial Medical Service, to Phyllis Victoria Reeks.

YOUNG—BERRY.—On Aug. 11, at Thorp Arch, Yorks, J. S. Young, captain RAMC, of Windsor, Ontario, to Evelyn Berry, VAD.

DEATHS

AITKEN.—On Aug. 6, at Glasgow, John Aitken, MD GLASG, formerly of Alassio, Italy.

HOLMES.—On Aug. 16, at Matlock, Geoffrey Holmes, MB CAMB, senior consultant, Smedley's Hydro, Matlock.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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UNIVERSITY OF LONDON, KING'S COLLEGE.

FACULTY OF MEDICAL SCIENCE.

The Medical Faculty at this College of the University gives instruction in the subjects of Medical Science for all the usual Pre-medical and Intermediate Examinations in Medicine, Surgery and Dentistry. Through the four associated hospitals, students of the College have clinical facility of over 1000 beds.

The Medical Faculty of the College provides a GENERAL UNIVERSITY EDUCATION in touch with other Faculties, classes of which medical students are permitted to attend. There are many College societies, clubs and functions in which students of all Faculties have opportunity of meeting each other. The College has an excellent athletic ground at Mitcham with a new and well-equipped pavilion.

The First Year subjects are taught in the Departments of the Faculty of Natural Science, and those for the Second and Third Years in the Faculty of Medical Science. This includes the Hambleden Department of Anatomy and the extensive Department of Physiology. The buildings of these Departments provide the College with a complete up-to-date Medical Faculty, which embodies the newest ideas in laboratory construction and equipment.

Valuable Scholarships and Prizes are awarded on the results of examinations held annually.

No hostel accommodation is available during the war.

For detailed prospectus of the Medical and Dental Courses and for further information apply to the Dean of the Medical Faculty or to—

Strand, W.C.2. S. T. SHOVELTON, M.A., Secretary.

L. M. S. S. A.

FINAL EXAMINATION: SURGERY, October 11th, November 8th, December 6th, 1943; MEDICINE, PATHOLOGY, October 18th, November 15th, December 13th, 1943; MIDWIFERY, October 19th, November 16th, December 14th, 1943.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

Royal College of Surgeons of England.

LICENCE IN DENTAL SURGERY.

Notice is hereby given that the following Examinations will commence on the dates stated below :—

FIRST PROFESSIONAL EXAMINATION.
MONDAY, 13TH SEPTEMBER.

SECOND PROFESSIONAL EXAMINATION.
TUESDAY, 14TH SEPTEMBER.

Candidates who have fulfilled the necessary conditions, and who desire to present themselves for examination, must give notice in writing to the Director of Examinations, Examination Hall, 8–11, Queen-square, London, W.C.1, at least twenty-one days before the Examination, transmitting at the same time such certificates as may be required by the regulations, together with the full amount of the fee for the Part or Parts of the Examination for which they desire to enter.

HORACE H. REW, Director of Examinations.

The Medical Research Council of IRELAND

contemplates the initiation of research on the Chemotherapy of Tuberculosis and in this connexion invites applications for the following two Research Fellowships to be held in Dublin :—

(1) FELLOWSHIP IN BACTERIOLOGY. Candidates should present evidence of special training and experience in bacteriology.

(2) FELLOWSHIP IN ORGANIC CHEMISTRY. Candidates should have extensive research experience in organic chemistry.

The emoluments attached to each of these Fellowships will be up to £800 per annum, according to qualifications and experience. The Fellowships will be tenable for one year in the first instance, with the possibility of annual renewal up to a total period of five years.

Applications should state age, education, training, qualifications, and experience, give names of three referees, and be accompanied by reprints of published work. They should reach the HONORARY SECRETARY, Medical Research Council of Ireland, 85, Merrion-square, Dublin, not later than 1st October, 1943. Candidates may be required to present themselves for interview in Dublin.

MALLING PLACE, KENT

For LADIES and GENTLEMEN of Unsound Mind.

Terms moderate. Apply to Resident Medical Superintendent. Telegrams: ADAM WEST MALLING. Telephone No. 2: MALLING.

CHISWICK HOUSE,

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Telephone: PINNER 234.

A Private Hospital for the Treatment and Care of Mental and Nervous Illnesses in both Sexes.

A modern country house, 12 miles from Marble Arch, in attractive and secluded surroundings. Fees from 10 guineas per week inclusive. Cases under Certificate, Voluntary and Temporary Patients received for treatment.

DOUGLAS MACAULAY, M.D., D.P.M.

FENSTANTON at "FIVE DIAMONDS," Chalfont St. Giles, Bucks

A Private Home for the Care and Treatment of a limited number of LADIES with Mental and Nervous Disorders. Certified, Voluntary, and Temporary Patients received. Mansion with 12 acres of ground. (See *Medical Directory*, p. 2441.) Apply Resident Physician. Telephone: Little Chalfont 2046. Station: Chalfont and Latimer.

THE COTSWOLD SANATORIUM

On the Cotswold Hills, seven miles from Cheltenham, Stroud and Gloucester. Fully equipped for the treatment of all forms of Tuberculosis.

Terms: 5½ to 9½ guineas per week, inclusive.

Full particulars from MEDICAL SUPERINTENDENT, COTSWOLD SANATORIUM, CRANHAM, GLOUCESTER.

Telephone: Witcombe 81 Telegrams: "Hoffman Birdlip"

CRICHTON ROYAL, DUMFRIES

FOR NERVOUS AND MENTAL DISORDERS

Cases of Alcoholism and Drug Addiction are admitted. Every facility for individual treatment on the most modern lines. As the Hospital is well endowed, terms are exceptionally moderate.

Medical Certificates given anywhere in the British Isles are valid for admission of patients.

Physician Superintendent: P. K. MCCOWAN, J.P., M.D., F.R.C.P., D.P.M., Barrister-at-Law. Tel.: Dumfries 1119.

CALDECOTE HALL

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Residential treatment of

"Nervous Disorders" & Alcoholism

(Certifiable cases are not received)

This beautiful mansion situated in the heart of the country (less than two hours from London by L.M.S.R.) and surrounded by charming pleasure grounds in which games and outdoor occupational therapy are available is devoted to the treatment of Alcoholism and "Nerves" by psychotherapeutic and ancillary methods.

Illustrated Brochure and particulars obtainable from A. E. CARVER, M.D., D.P.M., Resident Medical Superintendent.

PECKHAM HOUSE, 112, Peckham Road, London, S.E.15

Telegrams: "Alleviated, London" Telephone: Rodney 2641-2642

A Private Mental Hospital, for Ladies and Gentlemen suffering from Nervous and Mental Illness, where the amenities of a comfortable home are combined with full investigation and every well-established modern treatment.

Terms from 3½ guineas weekly.

Illustrated Prospectus may be obtained from the Physician Superintendent.

CAMBERWELL HOUSE, 33, Peckham Road, London, S.E.5

Telegrams: "PSYCHOLIA, LONDON" FOR THE TREATMENT OF MENTAL DISORDERS Telephone: RODNEY 4343 (5 lines)

Completely detached Villas for mild cases. Voluntary Patients received. Twenty acres of grounds; own garden produce. Hard and grass tennis courts, putting greens, Recreation Hall with Badminton Court, and all indoor amusements. Occupational therapy, Calisthenics, Actino-therapy, prolonged immersion baths, shock and also modified insulin treatment. Chapel.

Senior Physician, Dr. HUBERT JAMES NORMAN, assisted by a resident Medical Staff and visiting Consultants

An Illustrated Prospectus giving fees, which are strictly moderate, may be obtained upon application to the Secretary

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FOR EARLY AND CONVALESCENT CASES Recreational Therapies are held daily by skilled Leaders

The house stands high with spacious balconies and extensive views of the South Devon Coast. Beautiful garden. Own Dairy in 25 acres. Private road to beach. There is also a charming house, EBWORTHY, MANATON, DARTMOOR, situated in 20 acres, 1100 ft. up for bracing moorland air

Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. *Telephones*—STARCROSS 259 and TEIGNMOUTH 289

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Managing Director: DAVID LAWSON, M.D., F.R.S.E.

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Medical Superintendent: R. Y. KEERS, M.D. (Edin.)

For prospectus apply to The Secretary, Tor-na-Dee, Murtle, Aberdeenshire Telephone: Culter 107

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FOR NERVOUS AND MENTAL DISORDERS

NORTHAMPTON

PRESIDENT: THE MOST HON. THE MARQUESS OF EXETER, K.G., C.M.G., A.D.C.

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., F.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, bio-chemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE

This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods: insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombieres treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-Ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for bio-chemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a Park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: No. 2356 and 2357 Northampton), who can be seen in London by appointment.

VALE OF CLWYD SANATORIUM

This Sanatorium is established for the treatment of Tuberculosis of the Lungs and the Pleural Cavities. It is situated in the midst of a large area of park-land at a height of 450 feet above sea-level. Average rainfall 29·57 per annum. Full day and night Nursing Staffs. X-ray plant. Every facility for Artificial Pneumothorax and for operations on the Chest. Electric Lighting. Central Heating.

For particulars apply to Medical Superintendent.

H. MORRISTON DAVIES, M.D., M.Ch. (Cantab.), F.R.C.S., Llanbedr Hall, Ruthin, N. Wales.

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A Private Hospital for the Care and Treatment of those of both sexes suffering from MENTAL DISORDERS

Extensive grounds. Detached Villas. Chapel. Garden Produce from own gardens. Terms very moderate.

CONVALESCENT HOME AT BOURNEMOUTH

standing in 12 acres of ornamental grounds, with separate villas, tennis courts, etc. Patients or Boarders may visit the Home by arrangement.

Illustrated Brochure on application to the Medical Superintendent, The Old Manor, Salisbury.

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A Registered Hospital for MENTAL DISEASES, and its Seaside Branch, GLAN-Y-DON, Colwyn Bay, N. Wales

THE object of this Hospital is to provide the most efficient means for the treatment and care of PATIENTS of BOTH SEXES suffering from MENTAL and NERVOUS DISEASES. The Hospital is governed by a Committee appointed by the Trustees of the Manchester Royal Infirmary. VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS RECEIVED

For Terms and further information apply to the MEDICAL SUPERINTENDENT *Telephone*: GATLEY 2231

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For Mental Cases with or without Certificates.

Ordinary Terms: Five Guineas per week (including Separate Bedrooms for all suitable cases without extra charge).

For forms of admission, &c., apply to the Resident Physician, CEDRIC W. BOWER.

INTERVIEWS IN LONDON BY APPOINTMENT.

CITY OF LONDON MENTAL HOSPITAL

Near DARTFORD, KENT

Ladies and Gentlemen received for treatment under certificates, and without certificates as either VOLUNTARY or TEMPORARY PATIENTS,

at a weekly fee of £2 9s., and upwards

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PRIVATE MENTAL HOME for Nervous and Mental illness. All forms of treatment available. Fees from 4 gns. per week upwards according to requirements. Vacancies occasionally exist at reduced fees on the recommendation of the patient's own physician.

Apply to Dr. J. A. SMALL. Telephone: Norwich 20080

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Open Air Occupation and Recreation for Patients, Farming, Gardening, Football, Cricket, Tennis, Bowls, etc. School recognised by Board of Education.

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1st Class (men only)	from £3	per week
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3rd Class (men and women) supported by Public Assistance Committees	„ 27/6	„
Education Committees	„ 33/6	„
Private	„ 21/-	„

For further particulars apply to—

C. EDGAR GRISEWOOD, A.C.A., 20, Exchange Street East, LIVERPOOL, 2

The London Chest Hospital,

Victoria Park, E.2.

Applications are invited for a Part-time SURGICAL REGISTRAR with experience in Thoracic Surgery. Salary up to £350 per annum.

Applications to be submitted to the undersigned on or before 27th August, stating age, qualifications, experience, together with three copies of recent testimonials. Further particulars may be obtained from: THOMAS BROWN, Secretary.

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Examining Surgeons:

FACTORIES ACT, 1937.

The following appointments as Examining Surgeons under the Factories Act, 1937, are vacant.

Applications should be sent to the CHIEF INSPECTOR OF FACTORIES, 28, Broadway, London, S.W.1.

District	*County*	*Latest date for receipt of application*
WHITCHURCH ..	HANTS ..	31ST AUGUST, 1943
GUNNISLAKE ..	CORNWALL ..	31ST AUGUST, 1943

St. Mark's Hospital for Cancer, Fistula

AND OTHER DISEASES OF THE RECTUM,
City-road, London, E.C.1.

Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), vacant 1st October next. Preference will be given to candidates holding diploma of F.R.C.S. Salary £550 per annum, subject to approval by the E.M.S. R practitioners holding B2 appointments, and those holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, stating age, and accompanied by copies of three recent testimonials, must reach the undersigned on or before Wednesday, 1st September, 1943.

RAYMOND BULL, Secretary.

St. Mark's Hospital for Cancer, Fistula

AND OTHER DISEASES OF THE RECTUM,
City-road, London, E.C.1.

Applications are invited for a CLINICAL ASSISTANTSHIP in the OUT-PATIENTS' DEPARTMENT on Monday afternoons. The appointment is for six months from September next in the first instance, and a fee of three guineas is payable on appointment.

Applications to reach the SECRETARY (from whom further particulars may be obtained) at the Hospital by Monday, 30th August, 1943.

British Post-graduate Medical School

(UNIVERSITY OF LONDON).

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), vacant 30th September, 1943. The appointment is for six months. The salary is at the rate of £105 per annum, plus full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may also apply.

Applications, together with copies of three recent testimonials, should be made to the DEAN, British Postgraduate Medical School, Ducane-road, Shepherd's Bush, W.12, not later than Monday, 30th August, 1943.

West London Hospital, Hammersmith, W.6.

Applications are invited for the post of RESIDENT SURGICAL REGISTRAR AND TUTOR (B1), vacant shortly. The successful applicant will be enrolled in the E.M.S. and the salary, payable by the Ministry of Health, will be at the rate of £350 or £550 per annum, according to age and experience. The duties include teaching in the Medical School. It is desirable, though not essential, that candidates should hold one of the higher degrees or diplomas in surgery. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, giving full details of age, medical school, qualifications with dates, experience, and nationality, and accompanied by copies of three recent testimonials, should reach me not later than 2nd September. Selected candidates will be required to attend a joint meeting of the Medical Council and House Committee on a date that will be notified.

H. A. MAIDGE, Secretary.

The Hospital for Sick Children,

Great Ormond-street, London, W.C.1.

There are vacancies for Three CLINICAL ASSISTANTS, who will be required to attend morning sessions in the MEDICAL OUT-PATIENT DEPARTMENT. Payment will be made on a sessional basis. Preference will be given to Members of the Royal College of Physicians, holding the Diploma in Child Health.

Forms of application and further particulars will be sent on application.

H. F. RUTHERFORD, Secretary.

South London Hospital for Women,

Clapham Common, S.W.4.

Applications are invited from registered medical Female practitioners for the undermentioned appointments, vacant 1st October:—

(1) GYNÆCOLOGICAL HOUSE SURGEON (B2). The appointment, which is recognised for M.R.C.O.G., is for a period of six months. Salary is at the rate of £100 per annum, with full residential emoluments. W practitioners who now hold A posts may apply.

(2) RESIDENT MEDICAL OFFICER (B1). Applicants should have held house appointments. Salary is at the rate of £200 per annum, with full residential emoluments. W practitioners who now hold B2 posts may apply.

Applications, stating age, nationality, qualifications with dates, and accompanied by copies of three recent testimonials, should be sent to the SECRETARY at the Hospital as soon as possible.

The Willesden General Hospital,

Harlesden-road, N.W.10.

Applications are invited from registered medical practitioners for the appointment of RESIDENT CASUALTY OFFICER (B2), vacant 1st October, 1943. The appointment will be for a period of six months. Salary £175 per annum, with full residential emoluments. R and W practitioners who now hold A posts may apply.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to: J. N. DRAKE, Secretary.

London County Council.

TEMPORARY ASSISTANT DISTRICT MEDICAL OFFICERS required for—

(*a*) Areas V and VI, District C (part of the Borough of Fulham). Provisional salary £175 a year (including allowance for use of surgery).

(*b*) Areas IX and X, District L (part of the Borough of Greenwich). Provisional salary £325 a year.

Persons engaged required to carry out duties prescribed by Public Assistance Order, 1930, and to reside in or near district. Remuneration and conditions subject to review.

The vacancies exist during the absence of the appointed officers on war service.

Application form obtainable (stamped addressed foolscap envelope necessary) from MEDICAL OFFICER OF HEALTH, Staff Division (S.D.2), County Hall, S.E.1, returnable by 6th September, 1943. Canvassing disqualifies.

The Queen Elizabeth Hospital for CHILDREN

(Country In-patient Branch—65 Beds),
ASHENDENE, BAYFORD, HERTS.

APPOINTMENT OF RESIDENT MEDICAL OFFICER (B2).

Applications are invited from registered medical practitioners (Male and Female), including R and W practitioners now holding A posts, for the above appointment, vacant 1st October, 1943. The appointment will be for six months. Salary is at the rate of £200 p.a., with full residential emoluments.

Application forms may be obtained from the undersigned and should be returned, with copies of not more than three testimonials, on or before 31st August, 1943.

CHARLES H. BESSELL, General Secretary.
Queen Elizabeth Hospital, Hackney-road, E.2.

The Queen Elizabeth Hospital for CHILDREN, Hackney-road, E.2.

APPOINTMENT OF HOUSE PHYSICIAN (A) AND CASUALTY OFFICER (B2).

Applications are invited from registered medical practitioners (Male and Female), including practitioners within three months of qualification and liable under the National Service Acts for the A post, and R and W practitioners now holding A posts for the B2 post, for the above appointments, vacant 1st October, 1943. Appointments will be for six months. Salary is at the rate of £150 p.a., with full residential emoluments.

Application forms may be obtained from the undersigned and should be returned, with copies of not more than three testimonials, on or before 31st August, 1943.

CHARLES H. BESSELL, General Secretary.

Royal Waterloo Hospital for Children AND WOMEN, Waterloo-road, S.E.1.

Applications are invited from registered medical practitioners (Female) for the appointment of RESIDENT HOUSE PHYSICIAN (B2), vacant 1st October, 1943. The salary is at the rate of £200 per annum, with full residential emoluments. W practitioners who now hold A posts may apply, when appointment will be limited to six months.

Applications, stating age and qualifications with dates, should be sent to the undersigned and accompanied by copies of three recent testimonials. J. H. TEASDALE, Secretary.

Weir Hospital,

Weir-road, Balham, London, S.W.12.

Part-time Locum MEDICAL OFFICER, Female (for one afternoon, one evening, and every other week-end). Salary at the rate of £100 p.a., with emoluments.

Apply to the HONORARY SECRETARY-SUPERINTENDENT.

HIS MAJESTY'S COLONIAL SERVICE

THE COLONIAL MEDICAL SERVICE

VACANCIES FOR MEDICAL OFFICERS

The maintenance of an efficient Colonial Medical Service constitutes a vital part of the national war effort and it is most important that the Service should be assured of an adequate supply of doctors.

The Secretary of State for the Colonies therefore invites applications from doctors possessing a medical qualification registrable in the United Kingdom who are British subjects and who are under thirty-five years of age.

Medical Officers are appointed in the first instance for general service. But there are ample opportunities for work in special branches of medicine and surgery, in public health and in medical research.

The normal salary scale is from £600 to between £1,000 and £1,120. There are large numbers of super-scale posts to which promotion is made on merit and which carry higher salaries.

Government quarters, in many cases free of rent, and first-class passages to and from the Colonies are provided, and an adequate pension scheme is in force.

Selected candidates are normally required to attend a course of instruction in Tropical Medicine and Hygiene either before proceeding overseas or during their first period of leave.

Further particulars, including the regulations governing admission to the Colonial Medical Service, may be obtained from the Director of Recruitment (Colonial Service), 2, Park-street, London, W.1.

Hospital for Consumption and Diseases OF THE CHEST, Brompton.

Applications are invited from registered medical practitioners (Male and Female), including suitably qualified R and W practitioners who now hold B2 posts, for the appointment of RESIDENT SURGICAL OFFICER (B1). Applicants must have held a resident hospital appointment, and R practitioners now holding B1 posts cannot be considered unless they have been rejected by the R.A.M.C. The appointment is for twelve months, commencing on 1st November. Salary at the rate of £150 per annum, with board and residence, and an additional £25 per annum for services in connexion with paying patients.

Applications are also invited for the following appointments from registered medical practitioners (Male and Female), including R and W practitioners who now hold A posts:—

HOUSE PHYSICIAN (B2). The duties include work in the Out-patient Department as well as in the Wards, and the appointment is for six months, commencing on 1st November, with an honorarium of £50 and board and residence.

HOUSE PHYSICIAN (B2) at the SANATORIUM at FRIMLEY. The appointment is for six months, commencing on 1st November, with an honorarium of £50 and board and residence.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of one or more recent testimonials, should reach the undersigned not later than Saturday, 4th September, 1943.

Brompton, August, 1943. F. G. ROUVRAY, Secretary.

Queen Charlotte's Maternity Hospital, Goldhawk-road, London, W.6.

Applications are invited from registered medical practitioners for the appointment of ASSISTANT RESIDENT MEDICAL OFFICER (B1) for three months, vacant 1st October, 1943. Applicants should have held house appointments and had obstetric experience. Preference will be given to candidates holding the diploma of F.R.C.S. Salary is at the rate of £80 per annum, with full residential emoluments. On completion of the three months, the selected applicant will be expected to apply for the post of Senior Resident Medical Officer (B1), also for three months. Salary £100 per annum. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, stating age, qualifications with dates, nationality, previous experience, and accompanied by one copy of three recent testimonials, should be sent by the 6th September to—

SEYMOUR LESLIE, Acting Secretary-Superintendent.

Miller General Hospital. Greenwich High-road, S.E.10.

Applications are invited from registered medical practitioners for the appointment of SURGICAL REGISTRAR AND DEPUTY RESIDENT SURGICAL OFFICER (B1), vacant 20th September, 1943. Applicants should have held house appointments and had surgical experience. Salary is at the rate of £350 per annum, with full residential emoluments, subject to appointment by E.M.S. Suitably qualified R practitioners holding B2 appointments, also those holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, giving full details, together with copies of three testimonials, should reach the undersigned not later than 8th September, 1943. E. E. MARKS, Secretary.

14th August, 1943.

Westminster Hospital, St. John's-gardens, London, S.W.1.

Applications are invited for the post of ACTING ASSISTANT SURGICAL REGISTRAR (B1). Salary £250 per annum, with full board-residence. The duties are primarily to assist in the Casualty and Out-patient Departments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, together with copies of two recent testimonials, should be submitted to the undersigned.

CHARLES M. POWER, House Governor and Secretary.

Tilbury Hospital, Essex.

HOUSE OFFICER (A), including duties of Casualty Officer.

Applications are invited from British practitioners, including practitioners within three months of qualification who are liable to service under the National Services Acts, when appointment will be for a period of six months. Salary at the rate of £160 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and accompanied by copies of three recent testimonials, to be sent to the undersigned, marked "Tilbury." F. A. LYON, Secretary.

Seamen's Hospital Society, Greenwich, S.E.10.

Tilbury Seamen's Hospital, Tilbury, ESSEX.

Applications are invited from registered medical practitioners (Male) for the appointment of RESIDENT HOUSE OFFICER (B2), now vacant. The salary is at the rate of £250 p.a., with full residential emoluments. R practitioners who now hold A posts may apply, when the appointment will be limited to six months.

Applications, stating age, qualifications with dates, and accompanied by copies of three recent testimonials, to be sent to the undersigned marked "Tilbury."

F. A. LYON, Secretary.

Seamen's Hospital Society, Greenwich, S.E.10.

County Borough of West Ham. PUBLIC HEALTH DEPARTMENT.

Applications are invited for the post of TEMPORARY FIRST ASSISTANT MEDICAL OFFICER (Male) (B1) at FOREST GATE HOSPITAL, Forest-lane, E.7, for the duration of the war, but can be terminated by one month's notice on either side. The salary is at the rate of £525 per annum, rising by annual increments of £25 to a maximum of £600 per annum, plus temporary war bonus, with apartments, board, and laundry valued at £150. Suitably qualified R practitioners holding B2 appointments, also those now holding B1 and rejected by the R.A.M.C., may apply.

Candidates must be qualified registered medical practitioners, and preference will be given to those who have had, in addition to a general hospital appointment, an appointment in a hospital where they have had charge of maternity beds. The person appointed will be in charge of the Hospital during the absence of the Medical Superintendent.

The successful candidate must be prepared to serve in any other of the Council's institutions.

The appointment will be subject to the Council's regulations as made from time to time regarding holidays, sick pay, &c., and the successful candidate will be required to pass a medical examination.

Forms of application can be obtained from the Medical Officer of Health, 88, Romford-road, West Ham, E.15, on receipt of a stamped addressed foolscap envelope, and should be returned to the undersigned not later than 6th September, 1943.

Canvassing members of the Council is prohibited and will disqualify. CHARLES E. CRANFIELD, Town Clerk.

Town Hall, West Ham, E.15, 13th August, 1943.

Oldchurch County Hospital, Romford.

The Essex County Council invite applications from registered medical practitioners for the temporary appointment of ASSISTANT SURGEON at the above-named Hospital (968 Beds).

Applicants should possess a high surgical qualification and should have had extensive experience in surgery and be capable of undertaking major surgical operations. The successful applicant can be either resident or non-resident. Salary will be at the rate of £660 a year for a non-resident post, or £500 a year, plus emoluments valued at £160 a year, for a resident post.

Applications, accompanied by copies of not more than three recent testimonials, should reach me not later than Wednesday, the 1st September, 1943.

JOHN E. LIGHTBURN, Clerk of the County Council.

County Hall, Chelmsford, 13th August, 1943.

Borough of Swindon.

Applications are invited from duly qualified medical practitioners for the Whole-time Temporary appointment of DEPUTY MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER (due to the resignation of the present holder of the post) to the Borough of Swindon, at an inclusive salary of £600 per annum, rising by four annual increments of £25 to £700, plus such war bonus as may from time to time be paid by the Corporation, but in determining the commencing salary previous experience will be taken into consideration. There is also a car allowance.

Intending applicants must possess the Diploma in Public Health or an equivalent qualification, or have had experience in a Public Health Department.

The appointment will be terminable by three months' notice on either side.

Form of application and conditions of appointment may be obtained on application to the undersigned.

Applications, giving full information as to liability for military service, medical fitness, and position as regards deferment, and accompanied by copies of not more than three recent testimonials, must be forwarded in an envelope endorsed "Deputy Medical Officer of Health," to reach me not later than the first post on Saturday, 4th September, 1943.

D. MURRAY JOHN, Town Clerk.

Civic Offices, Swindon, 16th August, 1943.

County Borough of Ipswich.

Applications are invited from registered medical practitioners for the whole-time temporary appointment of ASSISTANT MEDICAL OFFICER OF HEALTH, probably for the duration of the war.

The possession of the Degree in Public Health or an equivalent qualification will be an advantage.

The salary scale is £600 per annum, rising by annual increments of £25 to £700, plus war bonus at the rate of £24 per annum and travelling expenses.

The successful candidate will be required to devote the whole of his or her time to the duties of the office, to assist generally as directed by the Medical Officer of Health in the administration of the various health services of the Council.

The approval of the Ministry of Health has been obtained for the appointment, and candidates should submit with their applications full information as to their liability for military service, medical fitness, and position as regards deferment.

Applications, accompanied by not more than three recent testimonials and endorsed "Assistant Medical Officer of Health," should be forwarded to the Medical Officer of Health, Elm-street, Ipswich, at once. A. MOFFATT, Town Clerk.

Town Hall, Ipswich, 16th August, 1943.

City of Liverpool.

FAZAKERLEY SANATORIUM. (313 Beds.)

APPOINTMENT OF RESIDENT ASSISTANT MEDICAL OFFICER (B2).

Applications are invited from registered medical practitioners, Male and Female, for the above appointment. The Sanatorium is for the treatment of pulmonary and non-pulmonary tuberculosis. Salary is at the rate of £250 per annum, with full residential allowances. All fees received in connexion with the appointment to be handed over to the City Council. The appointment will be made in accordance with the Standing Orders of the City Council and will be determinable by one month's notice on either side. R and W practitioners who now hold A posts may apply, when appointment will be limited to six months; otherwise will be for a period of twelve months.

Applications, stating whether R or W practitioner, age, nationality, qualifications (with dates), experience, and details of previous appointments, and accompanied by three recent testimonials, should be endorsed "Resident Medical Officer" and sent not later than 10 A.M., Tuesday, 31st August, 1943, to—

W. H. BAINES, Town Clerk.

Municipal Buildings, Dale-street, Liverpool, 2,
August, 1943.

City of Sheffield.

TEMPORARY ASSISTANT TUBERCULOSIS OFFICER (B1).

Applications are invited from registered medical practitioners, Male or Female (unmarried), of not less than three years' standing in their profession, for the above post.

The successful applicant will be required to reside at Winter Street Hospital and to devote the whole of his or her time to the Municipal Tuberculosis Scheme. Salary £350 per annum, rising to £550 per annum by annual increments of £25, with board, residence, and laundry. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 posts and rejected by the R.A.M.C., may apply.

Applications, stating age, qualifications, and experience, with copies of three testimonials, to be sent on or before 31st August, 1943, to the MEDICAL OFFICER OF HEALTH, Town Hall, Sheffield.

General Hospital, Nottingham, and NOTTS BRANCH OF THE BRITISH EMPIRE CANCER CAMPAIGN.

A MEDICAL OFFICER required for the RADIUM AND DEEP X-RAY THERAPY DEPARTMENTS. Full time, non-resident. Salary £1000 to £1200 per annum, according to experience.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to—

H. M. STANLEY, House Governor and Secretary.

General Hospital, Nottingham.

City of Plymouth.

MEDICAL OFFICER OF HEALTH'S DEPARTMENT.

CITY ISOLATION HOSPITAL—MOUNT GOLD ORTHOPÆDIC AND TUBERCULOSIS HOSPITAL.

Applications are invited from registered medical practitioners for the appointment of WHOLETIME TEMPORARY MEDICAL SUPERINTENDENT for the above hospitals during the absence on war service of the present holder, and probably for the duration of the war. Salary £800 per annum, with increments of £50 every two years, to £938, together with house, furnished or unfurnished, by mutual arrangement. Applicants must have had experience in the diagnosis and treatment of infectious disease, and will be responsible for the administration of the hospitals under the general direction of the Medical Officer of Health. Applications will not be considered from practitioners liable for service under the National Service Acts, and the appointment is subject to the passing of a satisfactory medical examination, and is terminable by three months' notice on either side.

Applications, stating age, qualifications, and experience, together with copies of three recent testimonials, should be sent as soon as possible to—

T. PEIRSON, Medical Officer of Health.

Seven Trees, Lipson-road, Plymouth.

City of Leicester.

CITY GENERAL HOSPITAL, Gwendolen-road.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), vacant about 1st October. Salary is at the rate of £200 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of six months; otherwise will not exceed one year.

Applications (on forms supplied), accompanied by copies of three recent testimonials, must be submitted as soon as possible, endorsed "House Surgeon, City General Hospital," and addressed to: E. K. MACDONALD, Medical Officer of Health.

City Health Department, Grey Friars,
Leicester, August, 1943.

Corporation of Aberdeen.

PUBLIC HEALTH DEPARTMENT.

Applications are invited for the post of TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH (Maternity and Child Welfare). Salary £900, rising by annual increments of £50 to £1000 per annum.

The person appointed will be required to undertake certain duties under the Regional Public Health Scheme, to which the Corporation and the County Councils of Aberdeen and Kincardine are parties.

Applications must be submitted on the official form, copies of which, along with memorandum containing the terms and conditions of appointment, may be obtained from—

D. B. GUNN, Town Clerk.

Town House, Aberdeen, 2nd August, 1943.

Southport General Infirmary.

(150 Beds.)

Applications are invited from registered medical practitioners (Male, single) for the appointment of HOUSE SURGEON (A), vacant 1st September. Six months' appointment. Salary is at the rate of £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may also apply.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of recent testimonials, should be addressed to the SUPERINTENDENT, Infirmary, Southport.

Doncaster Royal Infirmary.

Applications are invited from registered medical practitioners, Male, for the appointment of SENIOR HOUSE PHYSICIAN (B1). Salary is at the rate of £250 per annum, with usual emoluments. Suitably qualified R practitioners holding B2 appointments, also those holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, together with copies of two recent testimonials, should be forwarded immediately to—

R. LANCASTER, Secretary-Superintendent.

East Surrey Hospital, Redhill, Surrey.

Applications are invited from registered medical practitioners (Female) for the appointment of HOUSE SURGEON (B2), now vacant. The appointment will be for a period of six months. Salary at the rate of £150 per annum, with full residential emoluments. W practitioners who now hold A posts may apply.

Applications should be addressed to: E. C. AYLING, Secretary.

County Mental Hospital, Prestwich, MANCHESTER.

Locum Tenens MEDICAL OFFICER required immediately with a view to appointment as Temporary Medical Officer (B1). Salary £8 8s. per week, plus full residential emoluments. Applications from Male R practitioners holding B2 posts, also those holding B1 and rejected by the R.A.M.C., may apply.

Apply to the MEDICAL SUPERINTENDENT.

City of Manchester.

BAGULEY SANATORIUM. (421 Beds.)

APPOINTMENT OF TEMPORARY RESIDENT ASSISTANT MEDICAL OFFICER (B1).

Applications are invited from registered medical Men for the above-mentioned appointment, vacant in September. Candidates should have had experience in the treatment of pulmonary tuberculosis. The appointment will be temporary for the duration of the war. Salary £350 per annum, rising by annual increments of £25 to £450, with board, residence, and laundry valued at £85 in addition, subject to the Manchester Corporation conditions of service. A temporary cost-of-living wages addition is payable in addition to the salary stated. Suitably qualified R practitioners holding B2 appointments, also those now holding B1 appointments and rejected by the R.A.M.C., may apply.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, G.P.O. Box 399, Town Hall, Manchester, 2, and applications for the post must be received by him not later than 31st August, 1943.

Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 10th August, 1943.

Exminster Hospital, Devon.

Applications are invited from registered medical practitioners, Male and Female, for the following appointments, vacant 1st October, 1943 :—

HOUSE SURGEON (A). Salary at the rate of £120 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of six months ; otherwise will be for a period of one year.

RESIDENT HOUSE SURGEON (B2). The salary is at the rate of £200 per annum, with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to six months ; otherwise will be for a period of one year.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent as soon as possible to the MEDICAL SUPERINTENDENT, Exminster Hospital, near Exeter, Devon.

The Welsh National School of Medicine.

(UNIVERSITY OF WALES.)

Applications are invited for the full-time post of ASSISTANT LECTURER in the DEPARTMENT OF PATHOLOGY AND BACTERIOLOGY of The Welsh National School of Medicine, Cardiff, at a salary at the rate of £500 per annum, plus war bonus.

The person appointed will be required to commence duty as soon as possible.

Further particulars of the appointment may be obtained from : S. C. EDWARDS, Secretary.

The Welsh National School of Medicine, The Parade, Cardiff, 11th August, 1943.

The Children's Hospital, Sunderland.

(50 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), or alternatively HOUSE PHYSICIAN (A), vacant immediately. The appointment will be for a period of six months. Salary is at the rate of £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may apply.

M. J. HUNTLEY, House Governor and Secretary.

Botleys Park Colony, Chertsey, Surrey.

Applications are invited by the Surrey County Council from registered medical practitioners of either sex for the post of TEMPORARY SENIOR ASSISTANT MEDICAL OFFICER (B1) at the above colony for mental defectives. Candidates must possess a degree or diploma in Psychological Medicine, and should have had experience in Mental Hospitals or Mental Deficiency Institutions. Salary £600–£25–£700 per annum, with full residential emoluments. Only practitioners not liable for recruitment may apply.

Applications to the MEDICAL SUPERINTENDENT.

Royal Eye and Ear Hospital, Bradford.

(100 Beds.)

Applications are invited from registered medical practitioners, Male or Female, for the appointment of HOUSE SURGEON (B2). The appointment will be for a period of six months. Salary at the rate of £180 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply.

Applications should be sent to—

ERNEST S. HEAP, Secretary-Superintendent.

Royal Eye and Ear Hospital, Bradford.

Hull Royal Infirmary.

Applications are invited from registered medical practitioners for the post of CASUALTY OFFICER (A), vacant October. Salary £200 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of six months.

Applications should be addressed to—

R. J. CARLESS, House Governor.

County Borough of Bolton.

The Education Committee invite applications for the appointment of a Woman ASSISTANT MEDICAL OFFICER OF HEALTH and ASSISTANT SCHOOL MEDICAL OFFICER.

The person appointed will be required to assist the School Medical Officer in carrying out the work of medical examination of school children under the Education Act, 1921, and also when not required in school work to assist the Medical Officer of Health in child welfare and other public health work. She must be prepared to devote the whole of her time to the duties of the office and not engage in private practice. The consent of the Ministry of Health has been given to this appointment.

The appointment will be subject to the provisions of the Local Government Superannuation Acts, 1937 and 1939.

The salary will be between £500 per annum and £700 per annum (plus war bonus), according to qualifications and experience. Extra payments not exceeding £100 per annum may be made to a suitable candidate for evening work in the Venereal Diseases Department.

In accordance with the Ministry of Health's requirements the appointment in the first instance will be on a temporary basis.

Applications endorsed "Assistant School Medical Officer," stating age, qualifications, and previous experience, and accompanied by copies of not more than three recent testimonials, must be forwarded to reach the Director of Education, Education Offices, Nelson-square, Bolton, not later than Saturday, 11th September, 1943.

Canvassing, either directly or indirectly, will be a disqualification.

PHILIP S. RENNISON, Town Clerk.

Town Hall, Bolton, 6th August, 1943.

The Robert Jones and Agnes Hunt

ORTHOPÆDIC HOSPITAL, OSWESTRY.

Applications are invited from registered medical practitioners, Male or Female, including R practitioners who now hold A posts, for the appointment of RESIDENT HOUSE SURGEON (B2), now vacant. The appointment will be limited to six months. The salary is at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications, &c., with copies of recent testimonials, to be forwarded at once to the SECRETARY-SUPERINTENDENT.

Bodmin Emergency Hospital.

Applications are invited from registered medical practitioners, Male or Female, for the appointment of RESIDENT HOUSE SURGEON (B2). Salary is at the rate of £200 per annum, with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to six months, otherwise not exceeding one year.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three (recent) testimonials, should be sent to the MEDICAL SUPERINTENDENT, Bodmin Emergency Hospital, Bodmin, Cornwall, as soon as possible.

County Borough of Huddersfield.

ST. LUKE'S HOSPITAL.

Applications are invited for the position of JUNIOR RESIDENT MEDICAL OFFICER (A). Salary £230 per annum, plus war bonus at present £16 18s., in addition to the usual residential emoluments. The position is a superannuated one. Practitioners within three months of qualification and liable under the National Service Acts may apply, when appointment will be for six months ; otherwise not exceeding one year.

Applications should be forwarded, with copies of two testimonials, to the Medical Officer of Health, Huddersfield.

SAMUEL PROCTER, Town Clerk.

Town Hall, Huddersfield, 10th August, 1943.

Royal Berkshire Hospital, Reading.

Applications are invited from registered medical practitioners, Male and Female, for the appointments of :—CASUALTY OFFICER (A) and HOUSE PHYSICIAN (A), vacant 1st October, 1943. Salary is at the rate of £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may also apply, when appointments will be for a period of six months.

Applications, stating age, qualifications with dates, nationality and present post, and accompanied by copies of three recent testimonials, should be sent immediately to—

H. E. RYAN, Secretary and House Governor.

The King Edward VII Welsh National

MEMORIAL ASSOCIATION.

NORTH WALES SANATORIUM, Near DENBIGH.

(400 Beds—Pulmonary and Non-Pulmonary Tuberculosis : X-ray Department ; Major Operative Thoracic Unit, &c.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of JUNIOR RESIDENT MEDICAL OFFICER (B2). Salary at the rate of £200 per annum, with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to six months ; otherwise will be for a period of one year.

Applications to be sent immediately to—

V. EMRYS JONES, Acting Principal Medical Officer.

Memorial Offices, Cathays Park, Cardiff.

Surrey County Council.

WARREN ROAD HOSPITAL, GUILDFORD.
(General Hospital—450 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ASSISTANT MEDICAL OFFICER (B1). The position will be available for approximately the further duration of the war, and is subject to one month's notice on either side. Commencing salary according to experience at a point on the grade £350–£25–£450 p.a., plus full residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications to the MEDICAL SUPERINTENDENT.

Surrey County Council.

ST. HELIER COUNTY HOSPITAL, CARSHALTON.
(862 Beds.)
MATERNITY AND GYNÆCOLOGICAL UNIT.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of JUNIOR ASSISTANT OBSTETRICIAN (B2). Salary £250 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when the appointment will be limited to six months; otherwise will be for a period of one year.

Apply to MEDICAL SUPERINTENDENT.

Surrey County Council.

PUBLIC HEALTH DEPARTMENT.

ST. HELIER COUNTY HOSPITAL, CARSHALTON.
(862 Beds.)
KINGSTON COUNTY HOSPITAL, Wolverton-avenue, KINGSTON-ON-THAMES. (500 Beds.)

APPOINTMENT OF HOUSE OFFICERS (A).

Applications are invited from registered medical practitioners, Male and Female, for the above appointments. Salary is at the rate of £120 p.a., plus full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of six months; otherwise will not exceed one year.

Apply to MEDICAL SUPERINTENDENT.

Surrey County Council.

PUBLIC ASSISTANCE DEPARTMENT.

GROVE ROAD INSTITUTION, RICHMOND.
(260 Beds, mainly chronic sick.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of ASSISTANT MEDICAL OFFICER (B2). Salary £250 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to six months; otherwise will be for a period of one year.

Apply to COUNTY MEDICAL OFFICER, County Hall, Kingston-on-Thames.

City of Manchester.

CRUMPSALL HOSPITAL. (1400 Beds.)
(Recognised under the Regulations for the F.R.C.S.)

APPOINTMENT OF TEMPORARY RESIDENT ASSISTANT OBSTETRICAL OFFICER (B1).

Applications are invited from registered medical practitioners, Male and Female, for the above-mentioned post, vacant in mid-September, 1943. The appointment will be temporary for the duration of the war. Candidates should have had previous experience in midwifery. The basic cash salary scale commences at £350 per annum, and rises by annual increments of £25 to a maximum of £450, plus a temporary cost-of-living wages addition, with board, residence, and laundry in addition, subject to the Manchester Corporation conditions of service. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box No. 399, Town Hall, Manchester, 2, and applications for the post must be received by him not later than 31st August, 1943. Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 10th August, 1943.

City and County of Newcastle upon TYNE.

SHOTLEY BRIDGE HOSPITAL.

HOUSE SURGEON (A) TO THE DEPARTMENT OF RADIOTHERAPY.

Applications are invited from registered medical practitioners, Male and Female, for the above post, vacant 23rd October. The appointment is tenable for a period of six months and the salary is at the rate of £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts are invited to apply.

Applications to be sent to the MEDICAL OFFICER OF HEALTH, Town Hall, Newcastle upon Tyne, 1.

City of Birmingham.

PUBLIC HEALTH DEPARTMENT.

BABIES' HOSPITAL, CANWELL HALL, Near SUTTON COLDFIELD. (84 Beds.)

The Hospital deals with children under five years of age suffering with acute and chronic medical conditions. A RESIDENT MEDICAL OFFICER (B1) is required on 1st October, 1943, for a period of six months. The appointed officer will also be required to take two child welfare sessions weekly at the Maternity and Child Welfare Centres in the City of Birmingham. It is desirable for the candidate to have some special experience in children's work. Salary £350 per annum, with board, residence, and laundry. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, with copies of three testimonials, should be forwarded to the MEDICAL OFFICER OF HEALTH, Council House, Birmingham, 3, on or before 30th August, 1943.

St. Mary's Hospital, Colchester.

Applications are invited from registered medical practitioners (Male and Female), including R and W practitioners who now hold A posts, for the appointment of a HOUSE OFFICER (B2) at the above Hospital. The salary is at the rate of £200 p.a., with full residential emoluments. To R and W practitioners the appointment will be limited to six months: otherwise will not exceed one year.

Applications should be made in writing to the COUNTY MEDICAL OFFICER, County Hall, Chelmsford, and should include applicant's full name, age, nationality, qualifications, and details of previous posts (if any), and whether liable to service under the National Service Acts.

Bristol City and County Mental HOSPITAL, FISHPONDS.

Applications are invited from registered practitioners, including R and W practitioners holding B2 appointments and R practitioners now holding B1 appointments who have been rejected by the R.A.M.C., for the post of TEMPORARY ASSISTANT MEDICAL OFFICER (B1). Salary £525 per annum, rising to £600 by annual increases of £25, with full residential emoluments, and with excellent facilities and opportunity for study and research.

Applications to be addressed to the ACTING MEDICAL SUPERINTENDENT, Bristol Mental Hospital, Fishponds, Bristol.

Oxford County and City Mental Hospital.

LITTLEMORE, Near OXFORD.

TEMPORARY ASSISTANT MEDICAL OFFICER (B1) (Man or Woman) required immediately. Salary from £389 to £489, depending on previous experience which is not, however, essential, plus cost-of-living bonus. Extra £50 per annum for D.P.M. Emoluments valued at £100 per annum are additional and consist of board, lodging, and laundry. Appointment subject to the requirements of the Central Medical War Committee. R and W practitioners holding B2 posts, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Apply forthwith to MEDICAL SUPERINTENDENT, giving full particulars.

Bradford Children's Hospital.

Applications are invited from registered medical practitioners (Male or Female) for the appointment of HOUSE PHYSICIAN (B2), vacant 1st September. Salary will be £150 per annum, with board, residence, and laundry. R and W practitioners who now hold A posts may apply, when the appointment will be for six months.

Applications, stating age and nationality, with recent testimonials, should be sent to—

J. W. LONGLEY, Secretary-Superintendent.

Royal Lancaster Infirmary,

LANCASTER. (285 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A), vacant 4th September, 1943. Salary is at the rate of £130 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of six months; otherwise may be extended.

N. L. SMITH, Superintendent-Secretary.

Royal Albert Edward Infirmary and DISPENSARY, WIGAN. (Normally 189 Beds.)

Applications are invited from registered medical practitioners for the appointment of RESIDENT MEDICAL AND SURGICAL OFFICER (B1), vacant 1st October, 1943. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding Diploma of F.R.C.S. Salary is at the rate of £250 per annum, plus war bonus. Suitably qualified R practitioners holding B2 appointments, also those holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent as soon as possible to—

A. STANLEY BRUNT, General Supt. and Secretary.

12th August, 1943.

General Hospital, Nottingham.
(585 Beds.)

Applications are invited from registered medical practitioners for the appointment of RESIDENT ORTHOPÆDIC AND FRACTURE OFFICER (B1), vacant shortly. Applicants should have had previous experience in Fracture and Orthopædic work. The Orthopædic Department serves a large industrial district and the post offers exceptional experience in traumatic surgery. The appointment will be for a period of one year in the first instance. Salary is at the rate of £300 per annum, with full residential emoluments. Suitably qualified R practitioners holding B2 appointments, also those holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, stating age, nationality, qualifications, with three copy testimonials, to be forwarded as soon as possible to—
H. M. STANLEY, House Governor and Secretary.

General Hospital, Nottingham.
(585 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ANÆSTHETIST (B1), vacant 24th September. The appointment will be for a period of twelve months. The salary is at the rate of £300 per annum, with full residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, stating age, qualifications, experience, &c., together with copies of testimonials, to be sent to—
H. M. STANLEY, House Governor and Secretary.

Northampton General Hospital.
(408 Beds.)

Applications are invited immediately from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A). Salary at the rate of £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of six months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent as soon as possible to—
GORDON S. STURTRIDGE.

Northampton General Hospital.

Applications are invited from registered medical practitioners, Male or Female, for the post of Whole- or Part-time RADIOTHERAPIST. Salary £750–£1000, according to experience. If part time, salary will be subject to adjustment according to time available. Applicants should have had experience in radiotherapy and should possess the qualification of D.M.R.E.

Applications and copies of three recent testimonials should be sent to: GORDON S. STURTRIDGE.
31st July, 1943.

The Royal Hospital, Wolverhampton.
(Incorporated under Royal Charter.) (310 Beds.)

Applications are invited from registered practitioners (Male and Female) for the post of RESIDENT REGISTRAR (B1) to the EAR, NOSE, AND THROAT DEPARTMENT. Candidates must have held house appointments and be competent to undertake routine clinical and operative work. Salary is at the rate of £250 or more p.a., according to experience. R and W practitioners holding B2 posts, also R practitioners holding B1 posts and rejected by the R.A.M.C., may apply.
W. COCKBURN, House Governor.

The Royal Hospital, Wolverhampton.
(Incorporated under Royal Charter.) 310 Beds.

Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (B2), FRACTURE AND ORTHOPÆDIC DEPARTMENT, now vacant. Salary is at the rate of £150 per annum, with full residential emoluments. R practitioners who now hold A posts may apply, when appointment will be limited to six months.

Applications to be sent to W. COCKBURN, House Governor.
19th July, 1943.

The Burslem Haywood and Tunstall
WAR MEMORIAL HOSPITAL,
High-lane, TUNSTALL, STOKE-ON-TRENT.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), vacant shortly. Salary is at the rate of £175 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of six months.

Applications to: C. E. LOWNDES, Secretary.

Cornwall Mental Hospital, Bodmin,
CORNWALL.

TEMPORARY ASSISTANT MEDICAL OFFICER (B1), Male or Female, required 1st October, 1943. Salary £8 8s. per week, plus residential emoluments. Travelling expenses paid. R and W practitioners holding B2 posts, also R practitioners holding B1 posts and rejected by the R.A.M.C., may apply.

Applications to the MEDICAL SUPERINTENDENT.

City of Coventry.
MUNICIPAL GENERAL HOSPITAL.

Applications are invited for the vacant post of ASSISTANT RESIDENT MEDICAL OFFICER (A) from Male registered medical practitioners, including those within three months of qualification and liable under the National Service Acts, when appointment will be for a period of six months; otherwise will not exceed one year. Salary is at the rate of £150 per annum, with full residential emoluments. Appointment affords good opportunity of general experience.

Applications, stating age, nationality, qualifications, and experience, to be made as soon as possible to—
A. MASSEY, Medical Officer of Health.
The Council House, Coventry, 5th August, 1943.

Hull Corporation Health Department.
ANLABY ROAD HOSPITAL.

TEMPORARY ASSISTANT MEDICAL OFFICER (B1).

Applications are invited for the above appointment from registered medical practitioners of either sex. Salary £350 per annum, rising by annual increments of £25 to £450 per annum, plus war bonus, together with an allowance at the rate of £150 per annum in lieu of board, residence, and laundry outside the Hospital. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Forms of application, &c., may be obtained from, and should be returned duly completed to, the MEDICAL OFFICER OF HEALTH, Guildhall, Hull, not later than 10 A.M. on Monday, the 30th August, 1943.

County Borough of Preston.
SHAROE GREEN HOSPITAL. (250 Beds.)

Applications are invited from registered medical practitioners, Female, for the appointment of JUNIOR RESIDENT MEDICAL OFFICER (A), vacant 1st October, 1943. Salary is at the rate of £150 per annum, with full residential emoluments. W practitioners within three months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of six months; otherwise not exceeding one year.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, to the MEDICAL SUPERINTENDENT, Sharoe Green Hospital, Fulwood, Preston.

Staffordshire County Council.
STANDON HALL ORTHOPÆDIC HOSPITAL,
Near ECCLESHALL, STAFFORD. (120 Beds.)

RESIDENT MEDICAL OFFICER (B1).

Applications are invited from suitably qualified registered medical practitioners for the above-mentioned post, now vacant. The Hospital has an E.M.S. Fracture Department A. Salary is at the rate of £350 per annum, with full residential emoluments, and the appointment will be subject to one calendar month's notice on either side. The appointment will not exceed one year. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications must reach the undersigned by 26th August, 1943.
T. H. EVANS, Clerk of the County Council.
County Buildings, Stafford.

Royal Cornwall Infirmary, Truro.
(330 Beds—5 Residential.)

Applications are invited from registered practitioners (Male or Female) for the appointment of HOUSE SURGEON (B2) to the OPHTHALMIC and EAR, NOSE, AND THROAT DEPARTMENTS with some general surgical duties, now vacant. Salary is at the rate of £200 per annum, with full residential emoluments. Practitioners holding A posts (males must be rejected by the R.A.M.C.) may also apply, when appointment is limited to six months.

Applications should be addressed to the SECRETARY.

Royal Cornwall Infirmary, Truro.
(330 Beds—5 Residential.)

Applications are invited from registered practitioners (Male or Female) for the appointment of ORTHOPÆDIC AND CASUALTY HOUSE SURGEON (B2), now vacant. Salary is at the rate of £200 per annum, with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to six months.

Applications should be addressed to the SECRETARY.
July 28th, 1943.

Scarborough Hospital, Yorkshire.
(Normally 140 Beds.)

Applications are invited from Female registered medical practitioners for the post of HOUSE SURGEON (A). The appointment is for six months commencing immediately, at a salary of £175 per annum, with board, residence, laundry, &c. Practitioners within three months of qualification and liable under the National Service Acts may also apply.

Applications, with age, testimonials, qualifications, &c., to be sent immediately to the SECRETARY.

Leicester Royal Infirmary.

VACANCIES, 1st October, 1943.

Applications are invited from registered medical practitioners, Male and Female, on or before 27th August, for following posts:

GYNÆCOLOGICAL AND OBSTETRIC HOUSE SURGEON (B2). Minimum salary £125 per annum. The post includes supervision of Obstetrical Unit for abnormal cases.

TWO HOUSE SURGEONS (A). Salary £125 per annum.

RESIDENT ANÆSTHETIST (B2). Salary £150 per annum.

SENIOR CASUALTY OFFICER (B1). Salary £200 per annum. A suitable candidate will be asked to deputise for Resident Surgical Officer.

JUNIOR CASUALTY OFFICER AND EAR, NOSE AND THROAT HOUSE SURGEON (A). Salary £125 per annum.

ORTHOPÆDIC OFFICER (B2). Minimum salary at the rate of £200 per annum. The work includes a large Fracture Clinic.

TWO HOUSE PHYSICIANS (A). Salary £150 per annum. 6 months' appointments. All with full residential emoluments.

For the B1 post: Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

For the B2 posts: R and W practitioners who now hold A posts may apply.

For the A posts: Practitioners within three months of qualification and liable under the National Service Acts may also apply.

The B2 and A appointments will be made on 8th September.

H. T. PLOWMAN, House Governor and Secretary.

6th August, 1943.

County Borough of Wolverhampton.

TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH.

Applications are invited from duly registered medical practitioners of either sex for the above-mentioned appointment, at a salary of £650 per annum, plus war bonus and a car allowance on Class 2 of the Council's scale. The appointment is likely to continue for the duration of the war but will be terminable by two months' notice on either side.

Candidates must have had special postgraduate experience in infectious diseases, infant welfare, and antenatal work, and should preferably hold a Diploma in Public Health or State Medicine.

Under present regulations it is necessary for medical officers (as defined in Ministry of Health Circular 2818) liable by date of birth to military service, irrespective of medical unfitness or other exemption, to apply to the Ministry of Health to ascertain whether or not they will be permitted to apply for the vacancy.

Duties normally will be in connexion with the Maternity and Child Welfare Services and infectious diseases, but the officer appointed will be required to carry out any other duties assigned to him/her by the Medical Officer of Health.

The successful candidate will be required to devote the whole of his/her time to the duties of the office and will not be permitted to engage in private practice.

Applications, stating age, qualifications, and experience, with copies of three recent testimonials, should be sent not later than 28th August, 1943, to: J. BROCK ALLON, Town Clerk.

Town Hall, Wolverhampton, August, 1943.

County Borough of Grimsby.

GRIMSBY CORPORATION HOSPITAL. (180 Beds.)

Applications are invited at once from registered medical practitioners (Male or Female) for the post of RESIDENT MEDICAL OFFICER (B1).

The Hospital contains 100 Beds for all forms of tuberculosis and 80 Beds for fevers. Salary £350–£25–£450, plus war bonus, with board, lodging, and laundry. The post is temporary during the absence of the holder on war service. Superannuation Act in force. Duties in connexion with diphtheria immunisation. R and W practitioners holding B2 posts, also R practitioners holding B1 posts and rejected by the R.A.M.C., may apply.

Canvassing of members of the Council or any committee of the Council, directly or indirectly, will disqualify the candidate for the appointment. Candidates for the appointment must, when making application, disclose in writing whether to their knowledge they are related to any member of or the holder of any senior office under the Council. Failure to do this will disqualify the candidate for the appointment.

Applications, with testimonials, to the Medical Officer of Health, 1, Bargate, Grimsby. L. W. HEELER, Town Clerk.

Municipal Buildings, Grimsby, 9th August, 1943.

Royal Infirmary, Preston.

Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), vacant 20th September. The post affords an excellent opportunity for improving surgical practice. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding the diploma of F.R.C.S. Salary will be according to qualifications and experience, but a minimum of £350 (together with full residential emoluments) will be paid to a successful candidate possessing the F.R.C.S. diploma. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, stating full particulars and enclosing copy testimonials, should be addressed to—

Royal Infirmary, Preston. JOHN GIBSON, Superintendent.

Grimsby and District General Hospital.

Applications are invited from registered medical practitioners, Male and Female, for the following appointments:—

RESIDENT SURGICAL OFFICER (B1), vacant 1st September, 1943. Salary at the rate of £300 p.a. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

RESIDENT ORTHOPÆDIC OFFICER (B2), vacant 1st October, 1943. Salary at the rate of £275 p.a., with full residential emoluments.

RESIDENT ANÆSTHETIST (B2), vacant 1st October, 1943. Salary at the rate of £200 p.a., with full residential emoluments. The B2 appointments are for six months and R and W practitioners who now hold A posts may apply.

Applications, stating age, nationality, qualifications, and copies of three recent testimonials, to the SUPERINTENDENT.

Princess Royal Emergency Hospital, SWANSEA.

Applications are invited from registered medical practitioners, Male or Female, for the post of TEMPORARY ASSISTANT MEDICAL OFFICER (B1). The officer appointed will be in charge, under the direction of the Medical Superintendent, of a detached block accommodating approximately 50 ex-service T.B. patients and a small number of Serving Officers needing Hospital treatment. Salary £400 per annum increasing annually by £25 to £500 per annum plus War Bonus together with residential emoluments valued at £135 per annum. R and W practitioners holding B2 posts, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications to the Medical Superintendent as soon as possible and not later than 31st August.

Liverpool County Borough.

LOCAL EDUCATION AUTHORITY.

CHILD GUIDANCE CLINIC.

Applications are invited from Men or Women who are ineligible for service in H.M. Forces for the post of PSYCHIATRIST, either full time or part time. The salary offered is £800 per annum, plus war bonus if full time, which at present is £24 per annum, and £400 per annum (no war bonus) for part-time service of five sessions per week.

The officer appointed will work under the direction of the Medical Officer to the Education Authority, and if appointed in a full-time capacity will not be allowed to undertake private practice. The appointment will be subject to the Standing Orders of the City Council, and in the case of a full-time appointment to the Local Government Superannuation Act, 1937.

The canvassing of members of the Education Committee or City Council is strictly prohibited and will be considered a disqualification.

Applications, giving full particulars, such as date of birth, educational training, qualifications, and experience, together with copies of three recent testimonials or the names of three persons to whom reference could be made, should be sent to the undersigned by the 31st August, and endorsed "Child Guidance Clinic."

W. H. BAINES, Town Clerk,
and Clerk to the Local Education Authority.

The King Edward VII Welsh National MEMORIAL ASSOCIATION.

Applications are invited from registered medical practitioners (Male or Female, single) for the appointment of TEMPORARY ASSISTANT RESIDENT MEDICAL OFFICER (B1) at the ADELINA PATTI HOSPITAL, Craig-y-nos, Swansea Valley (114 Beds for the treatment of pulmonary tuberculosis in men and women, and surgical tuberculosis in children).

Applicants should have held house appointments and had institutional experience in the treatment of pulmonary tuberculosis.

Salary £350 per annum, plus full residential emoluments.

Suitably qualified R and W practitioners holding B2 appointments, also R practitioners now holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, stating age, nationality, qualifications, and experience, with particulars as to liability for military service and medical fitness, together with copies of three recent testimonials, should reach the undersigned by 23rd August.

V. EMRYS JONES, Acting Principal Medical Officer.

Memorial Offices, Cathays Park, Cardiff.

Middlesbrough Education Committee.

Applications are invited from duly qualified Men or Women for the temporary post of SENIOR ASSISTANT SCHOOL MEDICAL OFFICER (to act whilst permanent officer is on war service) in connexion with the medical inspection and treatment of school-children and such other duties as may be required by the Education Committee. Salary scale £700 per annum by £50 to £850 per annum. The Committee will take into account previous experience as an Assistant School Medical Officer in determining the amount of the commencing salary. The successful candidate will be required to devote his/her whole time to the duties of the office.

Forms of application may be obtained from the undersigned, and should be returned not later than Tuesday, 31st August, 1943.

STANLEY MOFFETT, Director of Education.

Education Offices, Middlesbrough, 3rd August, 1943.

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The St. Helens Hospital.

Applications are invited from registered medical practitioners for the following appointments, vacant 1st September :—

HOUSE SURGEON (B2). Salary at the rate of £225 per annum, with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to six months.

HOUSE SURGEON (A). Salary at the rate of £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of six months.

Applications, stating age, qualifications with dates, and nationality, accompanied by copies of three recent testimonials, should be sent not later than 24th August, 1943, to—

GEO. HARPER, Secretary.

Newcastle upon Tyne Eye Hospital.

Applications are invited for the position of HOUSE SURGEON (A) (Male or Female), at a commencing salary of £200 to £300 per annum (according to previous experience), all found. The staff consists of three House Surgeons and the Hospital is recognised for the purposes of the D.O.M.S. Practitioners within three months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of six months.

Applications, with testimonials, should be addressed to the SECRETARY, Eye Hospital, St. Mary's-place, Newcastle upon Tyne.

Bedford County Hospital.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (B2), vacant 1st September. The salary is at the rate of £190 per annum, with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to six months.

Bedford. HORACE R. NEATE, Secretary.

Royal Northern Infirmary, Inverness.

(298 Beds.)

Applications are invited from registered medical practitioners (Male and Female) for the undermentioned appointments :—

HOUSE SURGEON (A), General, vacant 15th September.

HOUSE SURGEON (A), Ear, Nose, and Throat, vacant now.

HOUSE PHYSICIAN (A) (two vacancies), vacant 1st Sept.

Salary at the rate of £100 per annum, with residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may, subject to the approval of the Scottish Central Medical War Committee, also apply, when appointments will be for a period of six months.

Applications, with copies of three testimonials, as soon as possible to ACTING SUPERINTENDENT.

Surrey County Council Hospital Service.

PART-TIME DIRECTOR OF PHYSICAL MEDICINE at ST. HELIER COUNTY HOSPITAL, CARSHALTON (862 Beds) and KINGSTON COUNTY HOSPITAL (500 Beds).

Salary £1200 per annum.

Applications for the above appointment from doctors of high standing in the specialty of Physical Medicine should be sent to the County Medical Officer, County Hall, Kingston-on-Thames, by 31st August, 1943.

The Director of Physical Medicine will be required to devote a minimum of twenty-four hours per week to the Council's service (eighteen hours at St. Helier Hospital and six hours at Kingston Hospital).

Applications will, however, be considered from candidates who can devote a substantial period to the duties at one or other of these hospitals, but who cannot give twenty-four hours per week to the Council's service. If a smaller number of hours per week is arranged the salary will be at a pro rata figure. The physiotherapy at St. Helier Hospital is a new department, including gymnasium and a wide range of treatment rooms.

DUDLEY AUKLAND, Clerk of the Council.

The Southampton Children's Hospital

AND DISPENSARY FOR WOMEN.

Applications are invited from registered medical practitioners, Men or Women, for the appointment of RESIDENT MEDICAL OFFICER (A). Salary is at the rate of £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts may also apply, when appointment will be for six months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by three testimonials, should be sent immediately to : ELLA K. MATTHEWS, Secretary.

Birmingham and Midland Eye Hospital,

Church-street, BIRMINGHAM, 3.

Applications are invited from registered medical practitioners Male and Female, for the appointment of a HOUSE SURGEON (B2), now vacant. Salary is at the rate of £130 per annum, with full residential emoluments, rising to £150 at the expiration of six months' satisfactory service. R and W practitioners now holding A posts may apply, when appointment will be limited to six months.

Applications, with full particulars, to be addressed to the HOUSE GOVERNOR.

King Edward VII Hospital, Windsor.

Applications are invited from registered medical practitioners Male or Female, for the appointment of HOUSE SURGEON (B1) in charge of IN- AND OUT-PATIENT CASUALTIES AND ACCIDENT SERVICE, vacant immediately It is desirable that applicants should hold the qualification F.R.C.S. Salary is at the rate of £300 per annum, with full residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 appointments and rejected by the R.A.M.C., may apply.

Applications, stating age, qualifications with dates, and nationality, together with copies of three recent testimonials, should be sent as soon as possible to : G. WESTON, Secretary.

Victoria Hospital, Burnley

(169 Beds.)

Applications are invited from registered medical practitioners (Male or Female) for the appointment of HOUSE SURGEON (A), vacant 10th September, 1943. Salary at the rate of £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts, may apply, when appointment will be for a period of six months, otherwise it may be extended.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of recent testimonials, should be sent to the undersigned immediately.

J. E. WHEATCROFT, Secretary.

Doctors, Male and Female, required for duration Locums, Locums, and Assistantships, in Yorkshire, Lancashire, Wales, &c. Good salaries paid. Vacancies for Hospital Locums and Ships' Surgeons.—Write A. SHAW, Medical Agent, Premier Buildings, 88, Church-street, Liverpool, 1.

Medical Assistant, part time, with bonus and view, wanted early October for small market town in Midlands. Must be able to drive.—Address, No. 313, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Assistantship in four partner practice with death vacancy, in county town thirty miles London. Small, easily run house, unfurnished, available. Age limit sixty, but partnership considered in case of younger man. Salary according to age and capacity. Housekeeper available. —Address, No. 312, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Reception Area.—Exceptional opportunity for two friends to acquire Old-established PRACTICE (partnership), increased since war. Within seventy miles London. Average receipts £3300. Panel over 3000. Separate Surgery premises. Houses available if desired. Accountant's figures.—Address, No. 311, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Intelligent and reliable Woman with first-class experience requires post as SECRETARY-RECEPTIONIST with a doctor in London. Well qualified in shorthand, typewriting, and book-keeping.—Address, No. 305, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Medical Practices and Partnerships for disposal; also Dental Practices. All classes of Insurance transacted.—Write A. SHAW, Medical Agent, Premier Buildings, 88, Church-street, Liverpool, 1.

Scottish County Town, ten miles from City.—Prosperous Medical Practice for Sale, with attractive house, garden, garage. Panel 2500, good private practice, hospital, &c. Scope.—Particulars from : Address, No. 309, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

South Warwickshire.—For Sale, good-class unopposed General PRACTICE in beautiful sporting rural area. Receipts £2500. Good house to buy or rent. Premium, 1¼ years' purchase minimum.—Address, No. 314, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Anglesey.—Established unopposed PRACTICE for Disposal. Gross income approx. £700. Nice house, every convenience. Further particulars write A. SHAW, Medical Agent, Premier Buildings, 88, Church-street, Liverpool.

Wanted, Scottish Country Practice, preferably coast or near. Receipts over £2000. Cash available for purchase.—Replies in strictest confidence to : Address, No. 310, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Financial Assistance can be arranged for the purchase of Medical Practices and Partnerships. For further particulars write A. SHAW, Medical Agent, Premier Buildings, 88, Church-street, Liverpool.

May we send specimen of Comparator STETHOSCOPE for clinical trial ? (No obligation) ; see issue of 18-7-42.—Capac Ltd., 2, Ullswater-road, London, S.W.13.

Doctors' Cars for Hire. Special rates for self drive. Telephone : FULham 7781.

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Bottles of 100 c.c. 4/6 (P.T. 7*d.* extra)
Bottles of 1000 c.c. 33/0 (P.T. 4/1½ extra)

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Containing 25 per cent mesulphen and 25 per cent sulphur
Tubes of 20 grammes 1/6 (P.T. 2½*d.* extra)

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